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NEWSPAPER

r Speeds Deliveries With CRT Entry

DEARBORN HEIGHTS, Mich. — "Going on-line with data entry, with CRTs right in the user department, has dramatically improved the timeliness and accuracy of our data," according to Don Kearney, controller of Transco, a firm hauling cars and other vehicles for the Ford Motor Co.

"Timeliness of data is critical," Kearney said. "When we receive a vehicle from Ford, we're given from 48 to 72 hours to get it on a truck and on its way to the dealer. By going on-line, we get the inventory information we need to the system in a matter of seconds. Under the old system using keypunches, it used to take a number of hours," he said.

CW Special Report on Source Data Entry follows Page 28.

Improved timeliness and accuracy of data are only part of the story, according to Kearney. Other benefits reported by Transco are increased user satisfaction through direct involvement with the system, better data control, greater security and the ability to schedule the data entry function according to the user's priorities, without interrupting the priorities of the keypunch department.

An even more important story is the way these results were achieved and the short period of time it took to go on-line, according to Bob Melvin, DP manager.

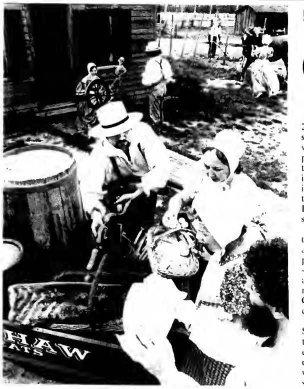
"In January of 1976 we had no in-house system of our own. All of our data processing was done outside by a facilities management group. All of our systems were batch-oriented and were written in RPG-II for an IBM System 3. Keypunching was a major bottleneck. Not only was it expensive, it was the source of both scheduling delays and data inaccuracies.

"In November 1976, just 10 months later, the situation was completely reversed. We were fully on-line to our own 370/125 with a 12-terminal data entry system that had dramatically improved our business operation and had cut out data entry costs," he said.

All of this was accomplished with a DP staff that was built from scratch and had no prior experience in on-line systems. "We had mapped out a very aggressive schedule when we decided to go on-line and at the same time bring the DP function in-house," Melvin said.

"To minimize any disruption of the existing applications we decided not to make any changes to the batch processing portions of the system during the cutover to

(Continued on Page 6)



Out of Sight, But...

Homesteaders outfitted in clothes of the early 1800s barter with a merchant at Smithville, a restored historic village. This southern New Jersey tourist attraction does its business data processing on an IBM System 32 (see story on Page 4).

Hammer Tells DPers Of Duties to Society

By Esther Surden
Of the CW Staff

NEW HAVEN — By the year 2000, one million to 10 million secretaries could be put out of work by a DP development that permits voice input to be translated directly into print, and it's the DP industry's responsibility to prepare society for this eventuality, according to Dr. Carl Hammer, director of computer sciences at Sperry Univac.

"DP management has an obligation to look into the state of the art because it will impact the primary force in our environment — people," Hammer told a group at the Data Processing Management Association's Northeastern Conference (Necon '77) here recently.

"The little old chip maker in Silicon Valley" is responsible for the unemployment of several hundred slide rule makers and is presently obsoleting the mechanical watch manufacturer, Hammer said.

The programmer may also be an eventual victim of the onslaught of the chip. "It will do the same thing to us that was done to the watch industry or the slide rule industry," he predicted, because it will put an end to the problems of verifying software.

If software is designed into a chip, it will do only what the designer wants it to do, he said.

Two compilers — Basic and APL — are already implemented in hardware in some systems in the mini and desktop system class, he noted. Even applications programs will be implemented on chips.

Future Innovations

"Eventually, certain parts of a program which we can define will be done in hardware and much of today's turmoil over software will have vanished," Hammer predicted.

Through LSI technology, more and more functions are being put on chips so, by the year 1990, there will be a computer the size of a fingernail with all the power of an IBM 360/40 that has about one million bits of memory and one million bits of logic, he said.

"This will certainly put an end to the mini vs. maxi debate," he stated.

And systems with large amounts of power in a small space will be needed because a complex society like ours is growing exponentially in complexity, he said.

"We pass about 20,000 laws each year in this country and about 5,000 of them affect payroll. There is no way to get along without systems because we make our own complexity," he continued.

But, "we have not yet learned how to build machines that are structured like our problems," Hammer said. The designer, therefore, still has a job ahead of him. "For example, payroll is a parallel operation," but "we restructure all problems to fit the machines," so payroll becomes a serial operation.

(Continued on Page 6)

Private-Sector Users Warned

OS/MVT 'Flunks Privacy Test' Twice

By Don Leavitt
Of the CW Staff

BOSTON — If you're using IBM's OS/MVT, you should promptly review the kind of data with which it's working to be sure it's not confidential.

That's the advice the "Computer Law and Tax Report" newsletter gave in the wake of a recent decision by the U.S. Comptroller General that OS/MVT operating on an IBM 360/65 does not meet the requirements of the Privacy Act of 1974.

While the Privacy Act currently applies only to federal agencies, private industry is likely to face comparable restrictions "in a few years" and had better be prepared for them, according to the newsletter's editor, attorney Robert Bigelow.

The decision against a Computer Network Corp. proposal for a time-sharing system to keep U.S. Navy personnel records marked the second time this particular variation of IBM's operating system "flunked the privacy test," Bigelow said.

The first adverse ruling was handed down two years ago, when the Comptroller General rejected an OS/MVT-based proposal from PRC Computer Center, Inc. That bid was intended to provide the Federal Energy Administration with dedicated DP service through a facilities management contract.

The rejected proposals involved different hardware — PRC's called for an IBM 370/168 — but in both cases the problem was the systems' inability to prevent unauthorized reading of the files, Bigelow explained.

Although the Comptroller General is not required to be DP-proficient, various users still working with OS/MVT feel his decisions were correct. The old software is "full of holes," according to one, while another pointed to studies made in the late 1960s that showed the software's failure to meet security standards which, though not based on the Privacy Act of 1974, covered "much the same area of concern."

Both of these observers were quick to point out, however, that in its newer operating systems — particularly the MVS releases of OS/VS2 — IBM has addressed and apparently solved the privacy problems found in OS/MVT.

OS/MVT was an outgrowth of OS/360, permitting multiprogramming with a variable number of tasks. With the continuing enhancement of OS/VS2 — itself an outgrowth of OS/MVT — IBM announced some time ago it would end centralized support for OS/MVT late this year.

Despite this, use of the software continues to be substantial and IBM has announced various "retrofits" on software originally intended just for VS environments.

(Continued on Page 4)

IBM Hikes 3/15 Storage, Adds Two More BSC Lines

By Frank Vaughan
Of the CW Staff

ATLANTA — IBM Corp. has expanded the main storage capacity of its System 3 line and enhanced the communications and systems programming support.

Maintenance diagnostic techniques for the System 3 were also improved, according to a spokesman.

Submodels of the 3/15D now offer 384K- and 512K bytes of main storage, up from the previous maximum of 256K bytes, the spokesman noted. The submodels are designated the 15D-25 and 15D-26.

The addition of either one or two more Binary Synchronous Communications (BSC) lines can be supported through a BSC controller (BSCC) and related features. The BSCC brings to four the number of BSC lines which can be attached to the 3/15D and increases to 90 the theoretical maximum number of 3270 series CRTs supported by Communications Control Programming, the spokesman claimed.

Release 2 of the System Control Programming software was announced by IBM to support the Model 15D and BSCC offerings.

(Continued on Page 2)

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IBM Halts Speculative Orders for CPUs

By Molly Upton
Of the CW Staff

WHITE PLAINS, N.Y. — IBM is attempting to lower the boom on speculative orders for the 3033 by changing its order acceptance procedure.

A machine's popularity is nice, but speculative orders for a machine are not nice, the firm seems to be saying.

The firm has initiated changes in its order acceptance procedures for its 3033 "to prevent unfairness caused by speculation in its machine delivery schedules."

IBM will no longer accept "speculative orders for its machines." Rather, it "will accept and schedule orders only from users, or prospective users, or from customers who will own such machines after their installation and will make them available for use by others," IBM said.

All those who have ordered or will order a 3033 will be asked to certify they do not intend to speculate with their delivery dates.

"This action is being taken to assure that customers have a fair chance to obtain as early a delivery date as possible without having to pay a premium to speculators," IBM explained.

The firm said it "has noted a significant increase in the number of individuals and companies that have placed orders for IBM equipment on the sole speculative hope that they would obtain an early delivery date.

"The objective of this speculative practice is to sell, or otherwide trade, an early date for a premium over the IBM purchase price at the expense of other customers who have received later delivery dates.

"The practice is self-fulfilling since the mere presence of such speculative orders inflates the number of orders to be scheduled, thereby forcing users and prospective users to receive later schedules than they otherwise would," IBM explained.

IBM said it noted a "sharp increase in speculative ordering activity" with the 370/138 and 148. With the announcement of the 3033 in March [CW, April 4], the number of such orders "reached an intolerable level," the firm added.

IBM has begun notifying customers of the new procedures, which will initially be applied to the 3033 processor, the 3036 console and the 3037 power and coolant distribution units.

However, IBM said it expects in the future this procedure will be applied "to any products where speculation is likely."

AT&T Puts in Preliminary Bid For 85 IBM Model 3033 CPUs

NEW YORK — AT&T has sent IBM letters of intent to order 85 of the recently introduced Model 3033 CPUs — worth up to $300 million — but AT&T does this for every new large IBM system, according to Robert F. Santos, director of data systems.

"It's not all that dramatic," Santos said, considering the Bell system has about 700 mainframes excluding minis.

And, he said, the letters of intent are not firm orders and imply no commitment on AT&T's part to take delivery of the systems.

In the past, however, AT&T has indeed taken delivery on a fairly high percentage of the machines for which it placed letters of intent, he added.

Waiting for Benchmarks

Santos has seen no benchmark results of the 3033 or of the Amdahl Corp. 470V/7 [CW, April 4], but he said the 3033 appears to be an attractive replacement for the 370/168, of which AT&T has several.

"I have the numbers IBM's talking about, but you have them, too. I'm just a skeptic; and would like to run my own jobs on them and see what happens," he said.

AT&T has not placed any letters of intent with Amdahl for the 470V/7. Amdahl "operates differently from IBM and is not much interested in letters of intent; it likes firm orders, and we're not ready to do that," Santos explained.

The letters of intent do not impact AT&T's orders for 470V/6s from Amdahl, he said, and there's always a possibility the 470V/7 or something else could be substituted for the prospective 3033s.

Santos said he was unable to give a specific breakdown of which operating units would receive the processors.

Counting minis, the Bell system probably has about 4,000 processors, he indicated.

Other major firms have also sent letters of intent to IBM for 3033s. A prompt letter of intent generally gives the sender an early delivery position.

Frequently a firm that finds it does not need the particular machine sells its early delivery position to another company anxious for that machine.

However, Santos said, AT&T does not sell its delivery positions; it just lets them go.

Westinghouse Ups Prices

PITTSBURGH, Pa. — Westinghouse Electric Corp. has announced a 9% price increase on computer and analog control equipment used in power generation, power transmission and distribution systems.

The price hikes were brought on by the rising costs of labor, the firm said.

IBM Boosts Storage of 3/15D

(Continued from Page 1)

Available in November at no charge, this software will reportedly support the BSCC and the two added BSC lines; increase to 488K bytes the maximum partition size in a Model 15D with 512K-byte main storage; and permit, through spooling techniques, the support of a second Model 1403 printer.

In the maintenance area, users of 3/12, 3/15B, 3/15C and 3/15D systems can now have certain diagnostic functions run under one partition or program level while executing programs in another area of memory, IBM said.

The diagnostics, which carry no additional charge, will be available in June for 3/12 users, in August for 15B and 15C users and in November for 15D users.

Purchase prices for the 15D-25 and 15D-26 are $141,680 and $155,680 respectively. Monthly rental prices are $4,604 and $5,240, while monthly lease prices are $4,186 and $4,764.

The BSCC costs $10,230, has a monthly lease price of $341 and a monthly rental price of $375.

On the Inside This Week

NEWS

Court Shouldn't Consider IBM vs. Catamore: IBM 4
Davis Leaving NBS, Heading for Pentagon 5
Distributed DP Seen Turning Experts Into Policymakers . . 7
EFT Projects Seen Showing Trends, Problems 8
Associations Only as Good as Educated Members 8
The *Waves of Change:* A Book by Charles P. Lecht 11

EDITORIAL

Editorial: Communicating the Message 14
Human Connection: Minis' Acceptance Keyed to Goals . 15
Taylor Report: System 250 Challenges Inventories 15

SOFTWARE & SERVICES

'Decs' Ends Keypunching, Backs DOS Data Entry 17
Software Enhances Xerox 1700 Usage 19
Early Study May Show User Won't Need Full DBMS 20
Edutronics Has TA Guide 21

COMMUNICATIONS

Wats Changes Seen Having Impact on Larger Users 23
Role of Communications Manager Expanding 24
Federal Screw Has Audio Response Multiplexer 25
Megadata Augments 700 Series With Specialized CRT . . 26

SYSTEMS & PERIPHERALS

Inforex Unveils 1330 Key-to-Disk System 29
Decentralized Processing Has Pluses, Minuses 30
Clothing Chain Controls Sales via Registers, Wands 31

MINIWORLD

Entry-Level I-8230 Expands NCR 8000 33
Mini Helps Measure Medical Benefits of Exercise 35
Turnkey Handles Multilocation Inventory 36

COMPUTER INDUSTRY

PCM Start-Ups Couldn't Make It Today: STC Founder . . 37
Users Cite Poor Service for Switch to Small Systems . . . 37
In-House Training Programs Help Cut Staff Turnover . . . 38
CDI Pursuing TI for Bigger Share of Terminals Mart 39
Wide Market for Personal DP Emerging 40
CSC Gets $3.2 Million Job From FAA 42

★ CW Special Report on SOURCE DATA ENTRY Follows Page 28 ★

Allows Investment Tax Credits

Appeals Court Rules Software Tangible in TI vs. U.S.

By Molly Upton
Of the CW Staff

NEW ORLEANS — A ruling often cited by opponents of sales taxes on software has been overturned by the U.S. Court of Appeals for the Fifth Circuit here.

In this latest opinion in Texas Instruments, Inc. vs. U.S., the court essentially found software to be tangible personal property.

TI, according to the ruling, may take investment tax credits on all the costs involved in a seismic data collection project rather than just the value of the magnetic tapes that were used to prepare computer-generated contour pictures of the earth's strata. The ruling applies to the years 1968 and 1969, when TI was capitalizing its development expenses for this project.

Although investment tax credits and the double declining balance method of depreciation are applicable only to tangible personal property, the appeals court defined property as "intangible if its intrinsic value is attributable to its intangible elements rather than to any of its specific tangible embodiments."

The court ruled "the value of the seismic data is entirely dependent upon existence of the tapes and film. If the tapes and film were destroyed prior to any reproduction of the film analog, nothing would remain. An investment in the data simply does not exist without recording of the data on tangible property.

"The seismic data tapes and films are tangible personal property used by" a TI subsidiary, Geophysical Service, Inc. (GSID), "in its business of producing copies for sale. The entire cost of producing such tapes and films must be included in the basis upon which investment tax credit should be allowed," the appeals court found.

In the previous ruling, "the District Court assumed, we feel mistakenly, that the resultant property in which [the] taxpayer was investing was intangible information. This assumption is based on the premise that the seismic information is the 'property' used by GSID in its business."

However, the appeals court continued, "this premise is incorrect. GSID uses only the data tapes and films to produce copies to sell to its customers."

Previous Ruling

The previous ruling had focused also on the permanence of the information collected. The district court said "the 'real' investment by TI is not in the tangible computer tapes themselves but in the seismic information which it collected: an intangible property . . . . Once collected that information would not wear out.

"True, technological innovation might render the information useless, but unlike a bulldozer or a conveyer belt, the collected information would remain trapped in precisely scattered electrons forever," the district court had ruled.

Data In Picture Form

GSID sold information to customers in the form of pictures depicting contours of the earth's different strata. Computers were used to convert sound vibrations to digital form and to then process this data into pictures representing a vertical slice of the earth.

TI retained the tapes and the original analog film.

During 1968 TI incurred costs of $934,070 and in 1969 $2.2 million related to the gathering of seismic data and the production of the pictures.

DOD May Soften Stance for Standard On Channel-Level I/O

By Molly Upton
Of the CW Staff

BETHESDA, Md. — The Department of Defense (DOD) may soon modify its stance on the proposed channel-level I/O interface standard based on the IBM 360/370 interface [CW, March 14], according to John Carabella, the department's acting director of data automation.

The DOD is currently on record with a "temporary nonconcurrence" to the standard. However, a flat nonconcurrence in the future is unlikely, Carabella said. The department may remove its objection if appropriate provisions are made with respect to enforcement and compliance, he said.

"It is likely the DOD will take a softer stance," he said.

Root of the Problem

Carabella hopes to submit the DOD position to the National Bureau of Standards (NBS) by the end of the month.

Since filing its initial position with the NBS, the DOD has polled its components, trying to get at the root of concern and to address it, he said.

Although industry sources indicated IBM might be softening its opposition to the standard by dropping the argument that the interface is technologically obsolete, IBM maintains its position has not changed.

However, observers have pointed out, the latest IBM product, the Model 3033 CPU, uses essentially the same I/O interface as the 360s.

Comment Period Extended

The NBS has extended the deadline for comments until the end of May, according to Harry White, associate director of automated DP standards.

The proposed Federal Information Processing Standard (Fips) is similar to that proposed by American National Standards Institute (Ansi). However, endorsement of the standard by the federal government would provide some measure of enforcement to the otherwise "voluntary" Ansi standard since it would be incorporated into government procurement procedures, he explained.

The NBS has received about 40 comments, White said, covering around 77 pages.

Although no tallies have been done, he indicated the systems manufacturers generally oppose the standard and independent peripherals makers support it, as do a large number of government organizations.

Life of Georgia Depends on ADR's ROSCOE® For Faster Job Turnaround, Faster Maintenance and Expanded System Access

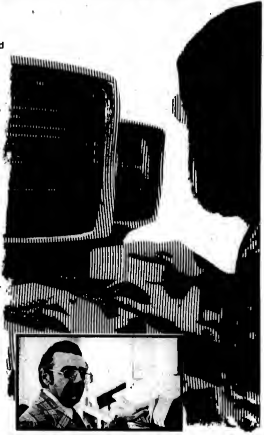
Two years ago, Life Insurance Company of Georgia installed ROSCOE, ADR's on-line conversational programming system. It was initially installed to speed computer program development, but Life of Georgia quickly found that ROSCOE also expanded direct computer access. Interactive procedures made the system easy to use without extensive training so that virtually any department could enter and update data through their own terminals. Self-prompting routines, using ROSPROCs, could direct users through even complex systems one step at a time. Information could be entered without keying-in locations or other detailed instructions, and corrections could be easily entered right over the old information, without re-keying whole data.

Today, nine ROSCOE equipped terminals are located throughout the company, giving many departments direct on-line access to 3400 operating programs. System specialists no longer wait in line to do a routine job.

Program development goes faster, too. With data-set recall, programmers call up the information they need, key-in required changes, and send it back again—without handling cards or paging through listings. "The greatest time savings comes from compiling COBOL programs," noted Earl Ryan. "ROSCOE asks the user what he wants to do and then tells him to enter the changes he wants to apply. As a result, turnaround time has been reduced at least 30%. And we have virtually eliminated JCL type errors."

"If we were to put our programmers back on the old keypunch system, we would have a real morale problem. It would be very difficult to take ROSCOE away now," Earl Ryan added.

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.



"It would be very difficult to take ROSCOE away now . . . ," Life of Georgia Technical Analyst, Earl Ryan, speaking about ADR's on-line conversational programming system.

For more information on what ADR software can do for you, call or write

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Case Raises No Federal Issues

High Court Shouldn't Consider IBM vs. Catamore: IBM

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. — The U.S. Supreme Court should not consider the case of IBM vs. Catamore Enterprises, Inc. since the case does not present any federal issues, according to a brief IBM recently filed with the high court.

"An independent review by this court would not be in keeping with its unique, primary constitutional function of deciding important federal questions," IBM stated.

Review by the high court is inappropriate now, IBM contended. Because "the Court of Appeals remanded the case, it is not yet ripe for review by this court," the brief stated, citing the case of Brotherhood of Locomotive Firemen & Enginemen vs. Bangor & Aroostook Railroad.

After Catamore received an $11.4 million judgment from a Rhode Island jury, the First Circuit Court of Appeals in Boston ruled there should be a new trial because a one-year statute of limitations applied to oral as well as written agreements.

Since then, Catamore asked for a reconsideration of that ruling, which was denied, and then filed a petition for a writ of certiorari with the Supreme Court [CW, May 2].

Catamore maintained the high court should hear the case because of an "invited error" in the judge's charge to the jury, the fact IBM did not raise the grounds on which the appeals court ruled and the denial to Catamore of its Seventh Amendment right to a trial by jury.

IBM's brief contended that Catamore's arguments attempted to obscure the fact the case does not present a federal question."

No Denial of Rights

In addressing Catamore's specific arguments, the IBM brief charged that the First Circuit Court of Appeals' order remanding a new trial was not a denial of Catamore's Seventh Amendment right to a trial by jury.

Rather, the appeals court's review was "clearly 'according to the rules of the common law' as expressly permitted by the Seventh Amendment," the brief stated.

The decision to order a new trial was not based on a "reexamination" of adjudicated facts, as Catamore had contended, IBM continued.

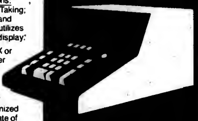
Counterbalancing Catamore's claim that IBM led the judge into an "invited error" in his charge to the jury, IBM noted the following:

"This is a case in which an appeal was warranted on many grounds because of multiple errors into which Catamore led the trial court and where appellate review was required to correct a manifest injustice resulting from a trial marked by confusion and to vindicate the fundamental principle that in a jury trial 'the judge and the jury share in the decision process.' "

IBM's brief detailed "inaccuracies" that IBM claims are contained in Catamore's petition to the Supreme Court. Catamore originally contended there were two alleged oral agreements, but focused on only one in its petition to the high court.

"What was presented to the jury was only the Catamore version of the agreement as being one for a turnkey production control system" rather than a systems design, IBM pointed out.

In addition, the appeals court's verdict was proper because of other errors — not cited by the court — committed by the district court over IBM's objections, the IBM brief argued.



TR-10

The TR-10 is designed to serve a variety of customized data entry applications. Factory Data Collection; Inventory Taking; Security; POS; EFTS; etc. It is a stand alone, send/receive device, which utilizes a single or dual-line alphanumeric display.

Communications to computer, MUX or poller concentrator can be via either RS232 or TTY (20mA) disciplines. Terminal will operate in half or full duplex modes either buffered or unbuffered (Serial, ASCII, Asynch).

Led status indicators can be customized to depict operational modes and state of terminal and line. Keyboard incorporates eleven key numeric cluster with ten additional customer-selectable option keys. Interface provisions exist for: Parallel Interfaces; Badge Readers; Strip Printers; Cassettes, etc.

A versatile-low cost data entry terminal

TR-10's can be hooked together in contention or multi-drop loops via CTC's Micro-Based MUX/Concentrator

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Small Business System at Hub Of Restored Village's Activity

SMITHVILLE, N.J. — Visitors to this 2,200-acre 1820-style American crossroads community would be surprised to learn that a very modern small business computer is the hub of business activity here.

Though out of sight, an IBM System 32 produces the payroll for the 700 or more regular and seasonal employees and does accounts receivable, accounts payable and general ledger for the historic "Old Village" and Smithville Inns here near Atlantic City.

Operated by the American Broadcasting Company, the historic village plays host to 750,000 students, antique and nostalgia buffs every year.

The 37-building complex from America's past comes alive when local people put on authentic clothes of the era, move into the village homes and shops and dip candles, shoe horses, spin flax and do countless other chores exactly as they were done over 150 years ago.

Across a nearby village pond is the companion Towne of Smithville which features dozens of restored Early American shops and three historic inns, one of which actually served stagecoach passengers in the 1700s.

The town stores sell their wares, ranging from homemade candy to antiques, and the inns serve up to 2,000 meals a day — taking in about $9 million a year.

A System 32 Model 5320 with two 3741 data entry stations makes up the community's system.

The Smithville Inns and the old village are part of American Broadcasting Systems' scientific and wildlife attractions.

U.S. Rules OS/MVT 'Flunks Privacy Test'

(Continued from Page 1)

One of the latest examples of such backtracking involves IBM's Sort/Merge 5740-SM1 [CW, Apr. 11], which is available for both OS/MVT and the simpler OS/MFT, which handles a fixed number of tasks.

The Computer Network decision, handed down in January, was the first in which a specific configuration was held to be insufficient to meet the Privacy Act's requirements, Bigelow said. The 1975 PRC decision specifically pointed out that technology then available could provide satisfactory protection, he noted.

In that ruling, the Comptroller General, consulting his own experts, found satisfactory read protection would have been provided on the 370/168 with IBM's OS/VS2 Release 2, although that environment might be less efficient than OS/MVT. Full read/-write protection was also available at that time on such non-IBM equipment as the Burroughs Corp. B6700, according to the newsletter.

The Privacy Act of 1974 requires federal agencies to "establish administrative, technical and physical safeguards to ensure the security and confidentiality of records and to protect against any anticipated threats or hazards to their security or integrity."

In the Navy's request for proposals, it specified the contractor should be "thoroughly familiar" with the Privacy Act and be able to demonstrate that the Bureau of Naval Personnel could comply fully with the law while using the proposed time-sharing system.

With that kind of language as an example, Bigelow warned his readers "in preparing specifications for systems that will include personal information, be sure to include security requirements that are at least sufficient to satisfy the current rules under the Privacy Act.

"While this *has* to be done for a federal data bank," he continued, "it's good policy to do it in all cases, since it's likely that compliance with some personnel security requirements will be enacted [for] private industry within the next few years."

"Computer Law and Tax Report" is published monthly by Warran, Gorham & Lamont, Inc., 210 South St., Boston, Mass. 02111. Bigelow's review of the OS/MVT cases is in the May 1977 issue.

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Davis Leaving NBS and Heading for the Pentagon

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Dr. Ruth M. Davis, who for nearly six and one-half years has been director of the National Bureau of Standard's (NBS) Institute for Computer Sciences and Technology, will leave that job toward the end of June for a new one at the Pentagon.

If all goes as planned, Davis will be confirmed by the Senate in mid- to late June and, in early July, will go to the Department of Defense (DOD) with the proposed title of Deputy Undersecretary of Defense for Research and Advanced Technology.

Regardless of her exact title, Davis said she will have charge of an area that commands 21% of the total DOD research and development budget or approximately $2 billion. She will report to the DOD Undersecretary for Research, Engineering and Systems Acquisition.

Davis joined the NBS Institute in December 1970 and said her stay there has been her longest in any job.

Commenting on her tenure at NBS and the few days she has remaining there, Davis said she hopes to sign off on the I/O channel interface standard — a standard which ultimately could save money for both government and industry users by allowing systems to be configured with components from independent competitive sources.

Now near completion, the standard was initially proposed seven years ago. The equipment compatibility problems it is intended to alleviate were the first pointed out to Davis when she arrived at the NBS.

The standard cannot be finally approved by the NBS until review by all interested parties is completed, and some of those deadlines have been extended, Davis noted.

While the outgoing director thinks her signature will make the standard official, she added that her deputy would probably be made acting director and could sign the standard in her absence.

Washington Update

Multiple Choice: Your Pick

Should software and computerized data bases be protected by copyrights, patents or trade secret clauses?

The National Commission on New Technological Uses of Copyrighted Works (Contu) wants your opinion.

On June 1, Contu plans to release its working papers dealing with the question of copyright protection for software and automated data bases and ask for public comments.

The commission stressed it has not taken a position and won't until it hears from software and data base users and from the industry.

To obtain a copy of the working papers, contact Carol A. Risher at Contu, Washington, D.C., 20558, or (202) 557-0996.

So Long, Financial Tracking

Congress is still hung up over a law that calls for the computerized maintenance and distribution of information on federal grants and loan programs.

The Federal Program Information Act was passed by the Senate, but has been stalled in the House. It is unlikely it will come to the floor, at the least, this week, according to sources on Capitol Hill.

But even when it does, all that will be accomplished by the legislation as it is currently written is the verification of the Federal Assistance Programs Retrieval System (FAPRS), designed by and already operating within the Department of Agriculture [CW, April 11].

Current versions of both the House and Senate bills charge the Office of Management and Budget (OMB) with continuing to prepare and distribute the *Catalog of Federal Domestic Assistance* and with establishing a grants data base accessible to state and local governments. That data base would mirror the FAPRS data base with a few minor changes, staff members on the congressional committees agree.

The original Senate bill, S. 904, called for a financial tracking system to be added to the data base. This system would have provided current financial information on each federal program, including how much money was left to be applied for and where remaining congressional funds had gone.

The financial tracking system, however, was compromised out of the bill during discussions between the Senate Governmental Affairs Committee and OMB, and the House Government Operations Committee has decided to make its bill, H.R. 6257, look like the Senate's.

Both bills agree that OMB should study the potential for providing financial information in the grants data base and report its findings to Congress one year from the date the legislation is passed.

"Congress has compromised away the heart of the bill. The result is a weak bill that does everything OMB wanted," a Capitol Hill observer said recently.

Wanna Fight?

BURLINGAME, Calif. — A meeting of all those interested in fighting and changing taxation legislation as it applies to software and services will be held at the Sheraton Hotel here on June 7 at 6:30 p.m.

The meeting will include an explanation of strategy and requests for membership and support in the effort.

Plans call for meeting with the state Board of Equalization, obtaining a ruling on the retroactive application of taxes and promulgating new legislation, according to Donald Mulvey, chairman of the subgroup formed by Calfornia members of the Association of Data Processing Services Organizations (Adapso).

About 75 to 100 firms are needed in the effort, Mulvey said, because estimates call for a "war chest" of $40,000.

All those interested in learning more about the effort are invited to attend. Guests will include Jerry Dreyer, executive director of Adapso, Alan Rievman, chairman of Adapso's tax committee and Lou Pfeiffer, president of Adapso.

More information can be obtained from Donald Mulvey, Computer Services Associates, P.O. Box 13172, Oakland, Calif. 94661.

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Trucker Speeds Car Deliveries With On-Line Data Entry

(Continued from Page 1)

the 370," he explained. "Instead we developed our own source-level conversion software which converted RPG-II for the System 3 to RPG-II for the 370."

He added that they also developed a converter which translated OCL for the System/3 into DOS JCL for the 370. As a result, Transco was able to convert its entire library of over 600 programs and 200 files from the System 3 to the 370/125 within the first 60 days of operation.

When it came to communications software, Transco selected Task/Master from Turnkey Systems, Inc. "Task/Master offered a number of advantages over alternative approaches," Melvin stated. "We could be on-line in a matter of days, we could get all of the required training and education in-house, and Task/Master did not require the extensive hackground in on-line systems that most of the other monitors demanded," he noted.

Major Benefit

The major benefit of Task/Master turned out to be its data entry feature which eliminated the need for Transco to write any on-line data entry software, Melvin said. "This was a major factor in our being able to convert over 70 data entry applications from keypunch machines to on-line 3270s in just a few months time,", he claimed.

"Using the interactive design facility of the data entry feature," he continued, "our systems analysts were able to sit at a CRT with the user and design new input formats in a matter of minutes. With just a few hours of training they were able to begin entering live data from their location.".

Automatic Editing Facilities

Interactive screen design wasn't the only benefit of the data entry feature. It also provided automatic editing facilities which checked each input field for accuracy, software which "extracted" the data for subsequent processing and automatic error recovery and restart facilities.

"Without these capabilities built into the software, we would have had to write our own applications for on-line data entry at considerable internal expense. We would not have been able to meet the aggressive schedule we had set for ourselves," Melvin noted."

Transco's main applications involve user input directly from their trucking terminals, with all the data being entered by the user's existing personnel. Inventory "receipts" are entered from 3270 terminals in both Dearborn and Wixom, Mich., and both Cincinnati and Lorain, Ohio. Constant track of a vehicle is maintained from the time Transco receives it until it's delivered to the dealer or another carrier. Other transactions being entered on-line include payroll data and all input related to billing accounts receivable, accounts payable and claims.

User reaction to the system has been very positive, according to JoAnn DePalma, a systems analyst who is responsible for user training and who has helped design most of the 150 screen formats that Transco now uses. "Once they found out what the system could do for them, how it improved the accuracy of the reports they were working with and how it saved them time, they took a lot more care in entering the data. Now they really enjoy using it."

Transco is currently running DOS/VS Release 33 on the 370/125 which has 256K bytes of memory. Although a number of batch applications are still in RPG-II, all new applications, both batch and on-line, are being written in Cobol. A bigger system and more on-line applications are already in their schedule for 1977.

Other Opportunities

"In addition to expanding our own systems, we're looking at a number of opportunities which would allow others to utilize our on-line facilities," Melvin added.

Two of the areas actively being pursued by Transco include providing services for smaller companies who cannot afford their own system and providing a general-purpose data entry facility for local companies who need additional capacity, he noted.

"We've made a great deal of progress in a short period of time," Melvin said, "thanks to some hard work by our systems and programming department. With the experience we now have in on-line systems, designing and implementing applications for other companies shouldn't present any problems we haven't already solved."

Hammer Urges Societal Concern

(Continued from Page 1)

We must "try to build systems in the future in which the machine is structured like the problem," Hammer continued. Some machines are beginning to be designed in parallel, but there is a problem in matching the data streams with the instruction streams.

Right now, such systems can only operate in short bursts, but these processors — called pipeline processors — will be available in the future to better manage the data we have, he said.

Developing Trend

Another trend toward managing data bases more effectively is also developing. Data bases do not presently allow any deviations. Signatures and other nonprecise data cannot be kept in traditional data bases, he indicated.

"For some applications — statistics, for example — you don't need 100% of the specified parameters," Hammer told the group. "You will be quite happy with 98%." Present data bases cannot handle this concept of fuzziness, but computer scientists are examining ways to change this, he noted.

A major change can be expected in the field of voice-to-print communications, Hammer said. Users currently operate keyboards for input and use their eyes to determine the output. However, more scientists are asking, "why can't we talk to the machine?"

Synthesis Difficult

The audio channel is one of those fuzzy channels, so voice and speech synthesis is hard to do, he explained. The system has to be able to perform selective voice-stream retention.

Although voice synthesis is a problem, translating voice into print is even more challenging, Hammer noted. It involves much more than just the management of data; it involves filtering data into information and then translating the information into intelligence.

"As time goes by, we will take the next step [from managing data] and perform certain tasks on an information level," he stated.

Human Element In Danger

"The human element, it turns out, is in danger," Hammer warned. The DP professional has an opportunity to do something about it before the technology that will translate voice to print puts millions of people out of work.

The DP professional has an obligation to retrain these people to be productive members of society, he said.

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Calls for Greater Management Talent

Distributed DP Seen Turning Experts Into Policymakers

By Esther Surden
Of the CW Staff

NEW HAVEN, Conn. — The status of DP experts will be enhanced with the advent of distributed processing because they will have more responsibility for making policy decisions, Patrick J. McGovern, chairman of International Data Corp. and publisher of *Computerworld*, told DP managers in his keynote address to the Northeastern Conference (Necon '77) here recently.

The management talent needed to run a totally distributed system is greater than that needed to run a centralized DP site, McGovern told the conference sponsored by the Data Processing Management Association.'

It will be a challenge to the DP community to maintain technical standards in code, formats and files throughout a distributed net and to make sure the entire system is well-documented. The central DP management will be responsible for this, he predicted, and will also help implement the individual sites.

Training will become "an enhanced responsibility" of the central DP management, he forecast.

Central DP management will also be responsible for the creation of a time schedule for hardware decisions on the local level and in general will control the long-term DP goals of the company. The central site will also be responsible for the security of the entire system, making sure it fulfills privacy requirements.

"I personally believe the trend toward distributed processing will be a healthy one," McGovern said. This trend grew out of an industry need to find new applications, he indicated.

In the decade of the 1960s, technology was transferred horizontally, McGovern said, and made available to a much larger base than ever before.

Later, the industry switched from adding new customers to adding new applications and moving terminals outwards to different users in the same organizations. The further evolution of computer history points to distributed processing rings in which data travels through the system without going through a traffic cop of a central system, he said..

Distributed processing is attractive to large users for several reasons, McGovern noted. First, the profit center manager is accountable for those costs incurred at that center. Secondly, a distributed system stays up, even when one part of the system may be down, thus avoiding a full-blown catastrophe to the organization. Third, people expect to save money.

CW at Necon '77

Prices in many areas are coming down, McGovern noted. Microelectronics is allowing the industry to reduce the cost of the central processor and main memory dramatically, and mass storage is becoming less expensive almost as quickly.

The cost of software development has decreased at 7% per year, he pointed out. By itself, this is not such a large drop, but multiplied by the number of packages based on the development effort, it can be seen as declining more quickly.

Cost reductions in the area of data transmission have come more slowly, but with new options opening up in the future this should also speed up, he said. Since distributed processing brings computer power into the hands of more users, many people ask if the public will be ready for it. McGovern said he believes they will be and cited the ever-growing numbers of personal computer users as evidence of a transfer of computer knowledge to individual workers.

In 1976, about 13,000 personal computers were bought; by the end of 1977 over 24,000 systems will have been acquired, McGovern reported, making this the fastest growing segment of the computer marketplace.

AT&T Device Detects Use of 'Blue Boxes'

NEW YORK — The New York Telephone Co. has begun using a device that will beat "blue boxes" at their own game and put an end to their 16-year success story over the Bell System.

The blue boxes enable their owners to make "toll-free" long distance calls by producing tones that match telephone company code sounds and misdirecting computer billing systems. An AT&T spokesman estimated the boxes cost the telephone company $5 million to $10 million every year.

The new counter-blue box device consists of electronic circuitry that detects the frequency of signals put out by the blue boxes. Telephone officials would not go into any more detail because they don't want the technology known and once again circumvented.

Now, within seconds after an illegal call is placed, both the number called and the calling number appear on a printout along with the time and the duration of the call.

Previously, blue box users were detected through a computer analysis of long-distance calling patterns. The Bell device immediately notifies an illicit caller that his call has been discovered, that he will be billed and that he should stop using the blue box or face possible prosecution, a spokesman said.

The device, developed by Bell Laboratories, is in use in several parts of the country. It can trace calls from any known blue box and will even trace calls to public coin-operated phone booths.

ICCP Sets Exam Deadline

NEW YORK — Programmers who want to sit for the Certificate in Computer Programming exam offered by the Institute for Certification of Computer Professionals (ICCP) must send in their applications by Aug. 31.

The exam will be given on Oct. 22 at various testing centers around the world.

Copies of the examination announcement and a study guide are available from the ICCP at 304 E. 45th St., New York, N.Y. 10017.

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EFT Projects Seen Showing Apparent Trends, Problems

By Toni Wiseman
Of the CW Staff

NEW ORLEANS — Electronic funds transfer (EFT) projects now have matured to a point where both trends and problems are apparent, Stephen J. Kohn told attendees of the American Bankers Association's 1977 National Operations and Automation Conference here recently.

Kohn, manager of Ernst & Ernst in Cleveland, noted that while go-it-alone EFT point-of-sale (POS) systems are technically feasible, the economics of such schemes have proven that joint, cooperative ventures are more probable — and possibly inevitable.

The extreme merchent-dependence of EFT systems and the absolute legal uncertainty of joint ventures were two problems highlighted by Kohn.

Bottom-Line Oriented

"Retailers are today seriously reconsidering where POS is going," Kohn told the session attendees. They are very, very bottom line-oriented — much more so than bankers — and will be very careful to avoid anything which could negatively affect that bottom line."

Kohn also outlined five key areas essential to successful planning and implementation. These include:

- Effective planning.
- Intelligent marketing.
- Thorough technical coordination.
- Careful financial measurement.
- Diligent attention to security concerns.

"EFT is just one of a whole host of strategies confronting banks; so in planning, management must have some idea of what overall plans and goals are and what the tactics will be to get them implemented," Kohn said.

Kohn stressed that a key step in implementing long-range plans, such as EFT systems, is an assessment of the bank's strengths and weaknesses.

He also cautioned against planning without careful consideration of legal constraints, emphasizing the uncertain environment in which EFT systems operate.

There are currently court suits against automated clearinghouses and the questions of sharing, terminal location, consumerism, privacy and security have yet to be resolved, he noted.

"These are not afterthoughts and must be considered at the very outset of planning," he stated.

Assess the Market

"Know more than you do now about the market you serve. Assess it carefully," Kohn urged, noting points to consider include the customer base, the competition, the specifics of the market and what the bank can and cannot do with retailers in the market.

"Know the difference between your market and others. There are some things you can do that others can't and visa versa. Cleveland is not Columbus, nor is Columbus New York City," he stated.

Kohn also urged the audience not to mimic the competition. Competitive reasons should not be a major reason for going into EFT systems, he cautioned.

Must Be Integrated

In the technical area, Kohn noted that EFT must be integrated into the bank's long term DP plan that deals with changes in technology, strategy and operation.

"EFT must not be allowed to take on a path of its own," he said. "If you want to be venturesome, entrepreneurial, recognize that if is essential for systems to be standard.

"Is it logical to have a unique, nonstandard system? What is the return? In the end there will be a collapse of EFT systems — it may be 10 years off — but it will happen and you want to avoid massive reprogramming and restructuring at that point," he stated.

A further cohsideration should be the direction of EFT technology and its costs, Kohn said.

No one wants to consider the true costs of EFT systems, but the financial ramifications must be faced, he indicated.

HP Holding Conference On APL Programming

WASHINGTON, D.C. — DP professionals who are knowledgeable about APL are invited to seminars here this Wednesday and Thursday where the use of virtual workspaces that facilitate program development and data management will be demonstrated.

The seminars will be conducted by Hewlett-Packard Co. as part of the *Computerworld* Computer Caravan here this week.

Optimization of program execution speed using subscript calculus techniques, the structured programming capabilities of APLGOL, the application of extended control functions and the use of a dynamic incremental compiler to enhance APL program execution will also be covered.

For reservations for the June 1-2 seminar, contact the APL seminer coordinator at (301) 948-6370.

NSF Sponsors Seminar To Focus on EFT Issues

BOSTON — A National Science Foundation (NSF)-sponsored conference focusing on electronic funds transfer (EFT) will be held here this Thursday and Friday.

The symposium, organized in coordination with the National Commission on EFT, will feature the presentation of papers by experts in banking, economics, technology, consumer groups and government.

Topics include the impacts on consumers, privacy-related concerns, economic impacts, technological issues and network systems and issues concerning use, access and control of EFT systems.

Further information on the June 2-3 conference is available from Kent Colton at Public Systems Evaluation, Inc., 929 Massachusetts Ave., Cambridge, Mass. 02139.

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WANG

DPMA's International President Says

Associations Only as Good as Their Educated Members

By Esther Surden
Of the CW Staff

NEW HAVEN — Associations are only as good as their educated members, Robert J. Marrigan, international president of the Data Processing Management Association (DPMA) told a group at the Northeastern Conference of DPMA (Necon '77) here recently.

"If we don't stay educated on particular issues then we don't know how to state our priorities," he said.

"You should develop your own personal positions on issues such as ethics, privacy and electronic funds transfer [EFT]," he said.

Marrigan asked the group, "What do you know about ethics? In some chapters, that's what holds up the back cover of the newsletter."

DP managers, he suggested, should learn about ethics and find out where they make their own individual tradeoffs.

DP managers should also take a stand in the fight for energy conservation, he continued. "We ought to look at our output requirements. After all, we have printers that are actually devouring trees."

The proper use of air conditioning to run systems is another energy-related area that the managers should explore, he said.

On the privacy front, "there are laws that were passed. Do you know enough about them?" he asked. Even if the manager's job today has nothing to do with privacy, chances are that he or she will be confronted with the issue some time during his or her career, he said.

"Is licensing good or bad or do you really know?" Marrigan challenged the group. Maybe licensing will help sometime down the road, so the manager should educate himself about it.

The DPMA is studying the possibility of providing a self-assessment program that will let the manager find out where he stands in relation to others in the profession. Each member should determine if this is a wise idea to pursue, he urged.

CW at
Necon '77

"EFT is going to affect you and your work" and this is an issue that needs a stand. "It is the wave of the future," he predicted, adding it is already affecting society.

A lot of checks that used to go through the mail are now being transferred through EFT systems and the lost revenue is hurting the post office, he noted.

Certification and recertification are also issues the members should explore.

Associations provide an ongoing personal education program that is self-paced, Marrigan noted. He said he disagrees with people who suggest DP needs one large super association.

"When the industry first began there wasn't one of us as a professional who couldn't get his arms around what was going on," but this has changed, he said.

Managers lean towards various specialties and different associations are available for everyone to join as he sees fit, he said.

DPMA Organizes Group for CDPs

NEW HAVEN. — The Data Processing Management Association (DPMA) has formed a special interest group for data processors who are certified, Robert J. Marrigan, international president, announced at the Northeastern Conference of DPMA (Necon '77).

The group will be limited to in-

The group will be limited to individuals holding the Certificate in Data Processing (CDP) granted initially by DPMA or currently by the Institute for the Certification of Computer Professionals.

"We are pleased to note that the Society of Certified DPers is currently surveying its membership in order to determine whether this group should affiliate with the DPMA CDP special interest group," Marrigan said.

The object of the special interest group will be to fulfill the needs of those individuals who "seek expanding educational opportunities for career advancement in the field of information management," he said.

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How to get a bigger CPU (without getting a bigger CPU)

The trick is in your COBOL programming. Whatever IBM 360/370, OS, OS/VS system and compiler it comes out of, it comes out fat. Unnecessarily fat, however efficient the program.

OPTIMIZER II solves that. Using techniques inaccessible to your programmer, your compiler, this software package automatically trims that fat. Without source program, compiler, system changes of any kind.

End result: an average of 10% less CPU time on every program optimized (not to mention 20% less storage).

A significant reduction, to be sure. But most of the 500 OPTIMIZER II users see it as a significant expansion. See?

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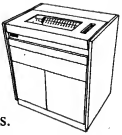
How to love DEC without marrying the whole family.

The PDP-11 is a real beauty. The CPU, that is. It's too bad we can't say the same for the peripheral members of the family. Especially the line printer. To us, it costs way too much, and it's hung-up on outdated technology.

That's why we're introducing the BST/300, 600 and 1000 LPM printers. For the first time, DEC users can have a printer that utilizes the latest chain technology, and yet costs 25% less. (Rent, lease or buy it.)

DG, Interdata and HP without the in-laws.

Again, great CPU's, so-so printers. And again, we can upgrade you while saving you a pile of money in the process.



And unlike other independent printer companies, BST offers 30-day delivery, nationwide service and spare parts availability, plus a national average service response time of less than two hours. In addition, a nationwide sales network insures direct company contact and support. It's this kind of service that has made us the #1 on-line peripheral company in the demanding IBM System/3 marketplace. (And we're going to do the same in the mini market.)

A better machine in the bargain.

You'll find that our chain-train design will eliminate the wavy lines normally associated with mini-computer printers. We're also fully buffered so that the CPU can perform other processing tasks between printer line settings. Sensing devices indicate complete paper status, and halt the machine if paper-out or paper-runaway conditions exist. As many as six clear copies can be made. Plug compatible, the BST printers require no changes to system software or user programs.

For full details (including the names of BST users in your area), just call our toll-free number: (800) 854-3111. In California (714) 549-9961. Or write to: Business Systems Technology, Inc., 3015 Daimler Street, Santa Ana, California 92705.

BST

The Waves of Change

By Charles P. Lecht

IBM's part in Satellite Business Systems and AT&T's introduction of alternatives to SNA and SDLC are two developments that portend a war between the giants. According to Lecht, that war will be fought – soon – on the data communications battlefield.

CHAPTER V

IBM and AT&T seem to be pursuing longer term strategies which suggest major competitive confrontations by the end of this decade. Both want to supply a total, end-to-end service based on devices capable of performing multiple functions (as opposed to today's dedicated, special-function devices).

Initially, the key challenge is to define the relative meaning of "data processing" in such a way as to arrive at some workable consensus on the meaning and roles of "message switching," "transmission," "circuit switching" and other, interdependent terms and concepts. This issue is currently being hotly debated by the Federal Communications Commission, the legislators and the various vendors for reasons far more compelling to the various debaters than mere semantic purity.

Some developments that can be viewed as early warning signs of the impending, "all-stops-out clash of the giants" include the following:

- IBM, Aetna and Comsat have undertaken a troika venture — Satellite Business Systems (SBS) — to create an all-digital domestic satellite system (to handle data, voice, video and other types of communication services).
- AT&T is offering an electronic funds transfer system in the State of Washington, with potential for nationwide expansion.
- IBM has publicly voiced its opposition to the connection of AT&T's Dataspeed 40 terminal in data processing networks.
- IBM is marketing a PABX system in Europe and plans to introduce an advanced PABX (code-named "Rosebud") domestically soon.
- AT&T has introduced and is evolving a competitive alternative to IBM's Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) line protocol in 1977.
- AT&T has sponsored legislation, entitled the Consumer Communications Reform Act, the essential aim of which seems to be to eliminate the competition in the data communications marketplace.
- AT&T is gradually expanding its digital data service (DDS) to 26 major cities in 1977 or shortly thereafter (Figure V-1), with the concomitant potential for future technological development and implementation of fiber-optic cables for local hookup (offering very wide-band transmission and high reliability).

Meanwhile, other companies are making their own moves: RCA has successfully launched its second satellite; Western Union is actively involved, as are the value-added network companies such as Packet Communications, Inc., Telenet, Graphnet and the special carriers.

All this activity is giving rise to a new wave of technological innovation within the communications industry that will reach the user with ever-increasing frequency during the 1977-80 period.

Why the Interest?

Why all the apparently sudden interest in data communications? Quite simply, because the market's absolute size and projected growth rates are enormous and, consequently, enormously attractive to industry heavyweights.

Some statistics will demonstrate its potential:

- Department of Commerce statistics show that telephone and teletypewriter traffic *alone* will constitute a $95 billion industry by 1985.
- By 1985, if current trends continue, it will cost less to transmit a facsimile letter than it will to send a conventional letter through the mail (AT&T claims this will be possible sometime in the 1978-79 timeframe).
- By 1980-81, about 80% to 87% of all the computers in the world should have at least one or more remote terminals on-line (Figure V-2).
- The demand for terminals and other communications equipment is expected to grow by approximately three to four times the rate of the general-purpose mainframe market.
- By 1980, more than 30% of the total users' hardware budget should go for communications-related products, with this demand expected to grow to over 50% by 1985.

IBM's acknowledgment of the stakes at issue is readily perceived in the scope of its SBS venture and the intensity of its government lobbying activities.

Colossi at War

In nearly all respects (excepting the literal deployment of firepower), the emerging struggle between the AT&T and IBM colossi recalls the spectacle of two great nations poised for war. Let us consider their "weapons resources" while noting the rather striking disparities between them as they parry for advantage.

At year-end 1975, AT&T had about five times the number of stockholders and fixed assets of IBM (or $80 billion vs. $15.5 billion, respectively); more than three times the "army" size (939,000 vs. 289,000 employees); nearly twice the revenues (about $14.5 billion for IBM vs. approximately $25 billion for AT&T); and about 1.5 times the net income in 1975 (nearly $2 billion for IBM vs. over $3 billion for AT&T).

On balance, however, IBM is far more profitable than AT&T when the percentage return on total investment is considered as part of the equation. Also, it is generally held that IBM is the better managed of the two contestants and richer in marketing capability than AT&T.

If you think the outcome of this "war" is a foregone conclusion, the remainder of this chapter provides additional facts whch suggest that neither party to the conflict can win — or lose — easily.

AT&T Marketing

The AT&T offering (the SNA and SDLC analogues) mentioned earlier, likely to be announced in 1977, is designed to provide users with an alternative to IBM's communications modus operandi. Its marketing thrust will be to offer users more flexibility than they have come to expect from IBM, which historically has been wont to *modify* the "de facto standards" it may itself have established, with a view to promoting "exclusivity" (i.e., maintaining technological pressure, quite naturally, to encourage the exclusive use of IBM auxiliary equipment).

The AT&T approach would be universal, in that compatibility with a large number of different products would be provided, assuring users that they would not be locked in by the effects of IBM's anti-establishment posture.

We sometimes forget that AT&T is a public utility governed from within *and* without. IBM, on the other hand, as with any other "free" enterprise, is subject to far less restriction. In addition, since AT&T would be providing *communications service*, various hardware which is currently acquired in toto by the user would be displaced by AT&T central office *shared* hardware, thus at least raising the possibility of reducing usage costs — all other things being equal.

What I really believe is that no matter who owns the store, higher user costs are inevitable.

Some of the projected characteristics of AT&T's potential service are listed below (based on an AT&T presentation to IBM's users in the spring of 1976):

(1) AT&T's offering is not quite a value-added network, but would set out to provide an alternative to IBM's proposed Systems Network Architecture.

(2) It would transfer to the telephone company's central office most of the *communications-related functions* that are now performed by central processor front ends, multiplexers, concentrators and remote controllers and intelligent terminals (these last currently the subject of a price war).

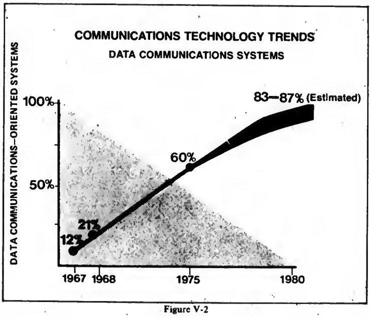
(3) It would be available "within much less than five years."

(4) Among other functions, it would provide network control, speed conversion, error control, terminal polling, message routing/rerouting and formatting. In IBM terminology, the system would exclude

(Continued on Page 12)

AT&T DDS CITIES ORGINALLY PROJECTED FOR SERVICE IN 1976

Figure V-1


COMMUNICATIONS TECHNOLOGY TRENDS

DATA COMMUNICATIONS SYSTEMS

Figure V-2

'The Emerging Struggle of the Colossi Recalls . . .

(Continued from Page 11)

access method (Vtam), but include network control program (NCP).

(5) It would stop short of "processing the information content of bits" (i.e., no data *processing* service). However, as a benchmark, its functionality would exceed that of the famous Arpa network (Figure V-3), which can only move constructed "packets" of information.

(6) A high-level language will allow users to specify their communications processing requirements in standard form.

(7) Besides central office equipment, some on-site controllers might be needed.

(8) Office automation will be one example of AT&T's industry marketing thrust; this is because significant changes in the way we conduct office activities are expected to occur (CRTs vs. typewriters, printers vs. copiers, electronic storage vs. file cabinets, all tied together into communications network systems), setting preconditions for communications network demands (Figure V-4).

(9) AT&T thinks its system will not violate the 1956 consent decree or 1970 computer/communications decision, but this position is obviously self-serving.

It seems that the new AT&T service could affect many different companies in both the data *processing* and data *communications* fields, but it is not yet clear exactly how.

(Continued on Page 13)

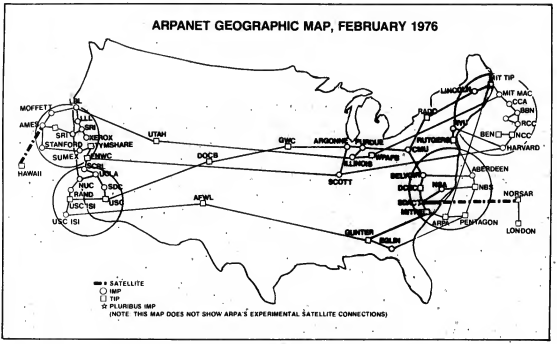
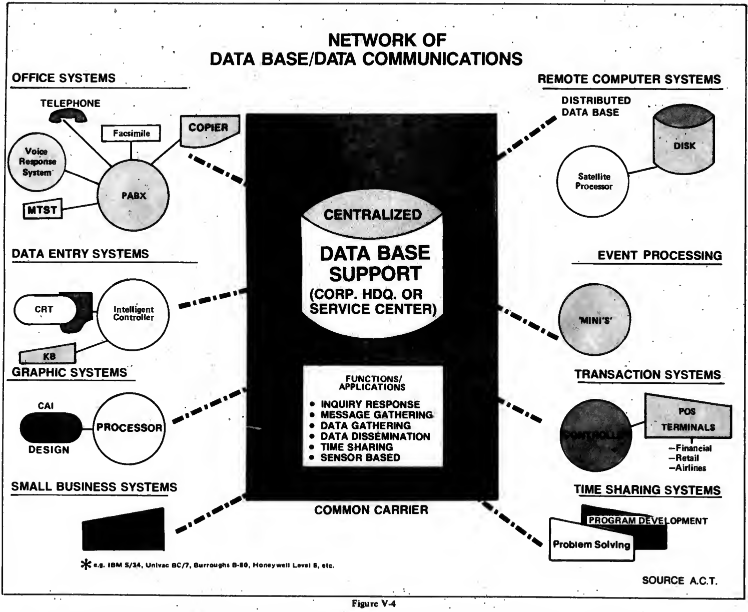


Figure V-3



SOURCE A.C.T.

Figure V-4

. . . The Spectacle of Two Nations Poised for War'

(Continued from Page 12)

For example, it might leapfrog the data services now offered by some independent common carriers (e.g., Telenet); it might open new attachability opportunities to independent terminal and minicomputer manufacturers, as well as mainframers; it might encourage those firms which have already announced their versions of SNA (Digital Equipment Corp., Burroughs, Honeywell and Univac) to drop their developments or continue at a cost which would not have to be borne by such competitors who piggyback on AT&T's services; it could open doors for certain firms to develop new, exotic peripherals for use in conjunction with the new services and for certain software and hardware companies which might be chosen to swell the ranks of AT&T's suppliers.

Defensive Stance

Given the fact that IBM is its chief competitor, it must be kept in mind that AT&T's new thrust might be considered no more than *defensive,* with IBM's opportunities in communications perhaps far exceeding Bell's in computers. Also, it is possible that IBM's SNA specs may be loosened up to provide levels of universality similar to those characterizing AT&T's service; with the proper specs disclosed, microprocessor chip sets could undoubtedly create compatibility between virtually any non-IBM and IBM systems.

Finally, despite AT&T's resource expansion, it may be a while before its marketing muscle in the data communications area can pretend to challenge IBM's.

A key variable determining AT&T's potential competitive impact may be the final resolution of the Dataspeed 40 issue. The arguments over whether this terminal should be considered a data communications or a data processing device (AT&T can't offer the latter, according to the 1956 consent decree) seem to be somewhat applicable to networking services as well.

In this light, it is apparent why AT&T is lobbying hard to expand its monopoly scope: If it fails, there will be residual leverage to *deregulate* some operations (thereby effectively circumventing the consent decree).

By 1978, AT&T claims, more money will be spent on data communications and its attendant services than on DP products and services. In contrast, the domestic data communications business — in terms of installed hardware and services — was worth about $5 billion in 1975 and is estimated to be growing at a rate approaching 20% annually over the next five years.

However, the advances in communications during the past five or so years have primarily been taking place in long-haul communications (satellites, microwave, etc.), whereas the important problems of network reliability and, at another level, high costs, lie chiefly in the area of local distribution.

Perhaps fiber-optic cables will resolve this key problem and lift the potential limitations on market growth over the next five to 10 years. In this regard, Dr. Howard Frank, president of Network Analysis Corp., stated: "The optical fiber may indeed be AT&T's answer to the projected competition from satellite carriers. It may be true that these carriers will, in the next 10 years, divert substantial traffic from the terrestrial network to the sky. However, in a later period this may return to the earth through an optical fiber transmission system."

Moreover, he predicted that "if the optical fiber promise does materialize, we will have to think about networks very differently from the way we do today. The resource, which is now limited, will be virtually unlimited. Thus, different resource allocation problems and different cost optimization techniques will be required. Those technologies which look most efficient today may in five to 10 years be very poor compared with the next level of technology."

Data Communications Trends

The data communications market in the U.S. alone has grown in value from about $4 billion in 1973 to $5.5 billion annual revenues in 1975. By 1985, AT&T projects a domestic market of over $22 billion. (In constant 1975 dollars, this represents a compounded growth rate of 15% per year.)

However, the shape of the data communications "revenue pie" is changing dramatically (see Figure V-5). The change in the relative shape of the pie slices is primarily a result of technological improvements. Clearly, AT&T cannot afford to participate solely in the transmission services aspect of the business, given that segment's expected, relative shrinkage to a 20% (or $4.4 billion) share of the 1985 market configuration.

Today, approximately 2,500 mostly dedicated (private) data communication networks exist in the U.S. This business is shared by many vendors, with no single one of them offering a "total system" solution. The environment is further characterized by the existence of many incompatible terminals, duplicate networks per application and low line, terminal and operator utilization.

By 1978-80, AT&T wants to improve this condition by combining computer and bandwidth services to allow any-terminal-to-any-terminal data communications, any host computer connection and coexistence of both old and new or "foreign" terminals; and by offering a shared intelligent network, thus making available low-cost credit checking, electronic funds transfer services and specialized terminal products.

In assessing the office communications market in the context of the "office of the future," AT&T claims that while a "typical" company 25 years ago was spending 20% to 35% of its budget on the office function, today this share has increased to greater than 50%. The five office functions which most readily lend themselves to automation are:

(1) The *preparation* function, through page display devices, word processing systems, optical character recognition, etc.

(2) The *control* function, through intelligent (or "high IQ") controllers.

(3) The *storage and retrieval* function, using hierarchical storage devices (bubbles).

(4) The *distribution* function, through electronic mail.

(5) The *reproduction* function, the need for which must diminish since it will be more cost-effective to keep documents in electronic form rather than in hard copy. (If this forecast is accurate, then Xerox's traditional business must change significantly if it is to survive in the 1980s.)

These five currently stand-alone functions will be absorbed into a total, integrated system solution, according to AT&T.

The following list spotlights and summarizes those facts which are now (and will likely continue to be) crucial to developments in the data communications and networks area:

- Legal and regulatory issues will be critical to the future growth of the industry.
- Programmable interactive and batch terminals will be in great demand.
- Most computer systems will have at least one communications line by 1980-81.
- Growth in network processors (i.e., multiplexers, line concentrators, nodal processors, front-end processors) will proceed at an annual rate of nearly 50% (starting from a relatively low base).
- AT&T and the foreign Postal, Telephone and Telegraph (PTT) authorities will continue to clash with IBM over protocol standards.
- IBM will not offer distributed control types of networks. Centralized IBM host CPU control and dependency will continue to prevent or reduce independent vendor replacement opportunities.
- Data security and control devices (encryption, etc.) will be essential in some industries and applications.
- Digital microwave and satellite networks will offer improvements, to several orders of magnitude, in line speed, reliability and availability, at lower cost.
- The SBS joint venture will yield in excess of $1 billion in annual revenues by 1985 (assuming that no major FCC or legal barriers arise).
- The IBM vs. AT&T battle will heat up during the 1977-80 period, and the outcome of this confrontation could dramatically change the scope and shape of the data processing market in the 1980s.
- The future of the postal service will in large measure be shaped by the result of the intensifying competition between IBM and AT&T.

PROJECTED IBM GROWTH MODEL

The Relative Importance of the Communications/Terminal Market

MAJOR PRODUCT CLASS	ESTIMATED % OF TOTAL '76 REVENUES	ESTIMATED GROWTH (VALUE OF INSTALLED BASE)
• Mainframes	35	7 - 8%
• System I/O Devices	32	9 - 10
• Terminals & Other Communications Products	9	30 - 35
• Office Products	11	17 - 18
• Small Business Systems	10	20 - 25
• Other	3	Unknown
	100%	

Figure V-6

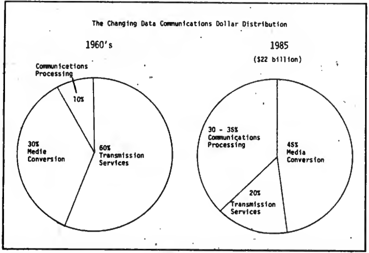


Figure V-5

Comparison of Estimated Terminal Product Profitability

	IBM	INDEPENDENT TERMINAL MFG'S
Product Cost	16%	24%
Development Cost	4	8
General Adm., Marketing & Corp. Expenses	43	30
Interest	None	7
Maintenance	9	20
Pre-Tax Income	28%	11%

NOTE: Based on 4 year installed life

Figure V-7

Editorial

Communicating the Message

There is little remaining doubt that corporate telecommunications is an ever-expanding area for business users. It was not so long ago that the telecommunications manager took care of black telephones and the more innovative persons took care of the company teletypewriters.

But, today, computers in one form or another have become an integral part of the business telecommunications domain. The obvious involvement is in data communications, where the telecommunications manager has gained expertise in modems, multiplexers, front ends and other related disciplines such as teleprocessing software.

The not-so-obvious computer assistance lies in the call-monitoring equipment that now automatically charges user departments for the calls made and helps optimize the flow of telephone traffic.

The more sophisticated of these computerized switchboards will decide the least-cost routing of a call and determine the priorities of users accessing the system.

This branching out of the telecommunications function has caused the managers of corporate networks to become much more than mere keepers of what inevitably was regarded as overhead operations.

Telecommunications managers are beginning to look at data, voice, facsimile and other disciplines as integrated functions that together fill the communications needs of a company.

The emerging role of these managers was much in evidence at the recent annual conference of the International Communications Association (ICA). This user organization represents more than 350 of the country's largest telecommunications users. Not coincidentally, the group also represents the largest telephone users, which are customers of the Bell System and its operating companies.

It was against this backdrop that an official of AT&T gave a talk that distressed ICA members. The speaker was Archie McGill, director of market management and development business at AT&T, who told the conference that Bell is changing its marketing approach (see story on Page 24).

ICA members had heard this type of claim before from AT&T, but McGill added a vital twist: "My view is that it is impossible to deal with only one person." From now on, Bell "will have to deal with people at all levels of a corporation," McGill said.

Many conference attendees regarded this as a threat to the integrated approach they were taking to optimize their company's communications needs. Coming from McGill, a former IBMer, the statement was probably not so surprising since it sounded very much like IBM marketing tactics.

But McGill's remarks did little to assure the communications users they would get support from the phone company in their attempts at optimization and efficiency.

There were some who felt McGill did not mean to be as harsh as he sounded but, taken literally, the new philosophy means Bell will sell its products and services to whomever will listen.

If the system is really the solution, as AT&T claims, then the phone company will have to live within the users' systems instead of trying to go around them.

Hopefully, McGill got the message.

'The Sands of Time'

Letters to the Editor

IPE Charges Burroughs Failed To Fulfill Its Obligations

We were dismayed to find "Burroughs Users Get Israel's Clal as Agent" [CW, April 18] a distorted and one-sided recount of what has actually happened.

International Peripherals Equipment Ltd. (IPE) is far (by Israeli standards) from being small, being in local peripherals sales second to IBM only. Among our customers one may find the government of Israel, the Defense Ministry, the Ministry of Treasury, the Technion and the Weizmann Institute, as well as the universities of Jerusalem and Ben Gurion. Our reputation for reliable and quick service and support is now a matter of record here.

As for the termination of our agreement with Burroughs, the article cited two reasons for it: IPE did not sell any Burroughs equipment and none of the then-existing 20 Burroughs installations wanted to switch over to IPE maintenance.

The agreement we've had with Burroughs did not stipulate any sales whatsoever up to the end of this year. As for the maintenance, all existing customers had contracts they could not untie without relinquishing their claims against Clal Systems/Tamkin Ltd.

Burroughs failed to fulfill its obligation to provide us with spares to maintain all the then-existing installations. Burroughs also failed to fulfill its obligation to put at our disposal Burroughs-skilled technicians (either by effecting their transfer from Tamkin to us or by flying in a team of its own).

Our company has invested huge amounts of money and efforts to promote Burroughs operations in Israel. We are now about to file a suit for damages against Burroughs for a seven-figure U.S. dollar amount in Fribourg, Switzerland.

B.J. Yohananoff
President

International Peripherals Equipment Ltd.
Ramat Gan, Israel

Package Costs Comparable

The article titled "N.Y. Center Finds 'Slick' Way to Ease Program Chores" [CW, May 9] described how the Community Blood Council of Greater New York, Inc. selected and utilized Slick, a source program management package from National Computing Industries.

The article stated DP manager Michael Hart considered several packages including The Librarian from Applied Data Research, Inc. (ADR), but chose Slick "primarily because it cost quite a bit less than the others."

This is an erroneous assertion. Slick costs $2,950; the Librarian/E, fully comparable to Slick, costs $2,850 under permanent license.

The article also stated Hart and his staff "were able to install the package over three-days' time." The Librarian/E is customarily installed in 20 minutes by an ADR technical support representative. This service is included in the license fee.

Robert M. Caugney
Vice-President

Applied Data Research, Inc.
Princeton, N.J.

No Shipboard Transmissions

The article entitled "Micro Enables High-Speed Plotter Output" [CW, May 2] briefly described some plotting activities of Marathon Oil Co. and its subsidiaries. The article contained some technical errors.

Marathon is not transmitting data from shipboard locations. All data is transmitted to the central DP centers at Findlay, Ohio, or Littleton, Colo., from onshore Datapoint Corp. 1100 intelligent diskette terminals or entered at the central DP sites. Output from the central computers, including plot files, is returned to these terminals.

At remote sites, the plotter is driven in an off-line mode by the terminal. At the central sites, the Zeta Research, Inc. plotting system is driven on line via an appropriate communications controller.

C.F. Mosier Jr.
Manager of Facilities Planning

Marathon Oil Co.
Findlay, Ohio

Data Past

Five Years Ago
May 31, 1972

CINNAMINSON, N.J. — A system that accepted voice input of words as well as digits was demonstrated by Threshold Technology, Inc.

— — —

NEW YORK — The top management of the largest computer-using companies in the country showed widespread dissatisfaction with DP, according to a survey by International Data Corp.

Eight Years Ago
June 4, 1969

PARK RIDGE, Ill. — Cmdr. Grace M. Hopper was selected as the first recipient of the Data Processing Management Association's Computer Sciences Man-of-the-Year Award. The award extended international recognition to outstanding contributions through distinguished service in the field of computer sciences and information processing.

— — —

WASHINGTON, D.C. — Spotting bad computer-based advice from the Pentagon was one of the tasks of a proposed congressional computer, according to Rep. William S. Moorhead (D-Pa.). A bill was under House consideration to decide whether the Controller General should establish a DP system for Congress.

Small Systems People – Part 4

Minisystem Acceptance Keyed to User's Personal Goals

By Jack Stone
Special to Computerworld

The chimes ring, the lights dim, the audience scurries to their seats, the orchestra strikes up the valedictory march and the curtain rises on the last act of the lyrical opera "O Miniparadisio!"

The three previous columns presented the viewpoints of three of the four dramatis personae that constitute the cast of this great production: the software vendor, the hardware vendor and the systems consultant.

Now the denouement. Enter the most crucial figure in this most noble of presentations, draped in the black velvet cape with red flannel lining — the mini user.

What manner of person is this? We in the DP industry, in our typical oratorical style of shrinking vast quantities of information into a few terse words, characterize the small business mini buyer as a "first-time user." This encomium, though widely accepted in the industry, unfairly generalizes the extremely diverse talents, interests, aspirations and desires of the mini user population.

Granting that their initial knowledge and expertise in the sacrosanct computing field is vanishingly close to zero, we frequently overlook the fact that computing is a crashing bore to the rest of the 230 million people in America.

We are too often critical of the technical ignorance of the small business user and are frequently callous to their callings. The results are painfully obvious — many of us convey the impression to the uninitiated of being arrogant fops and dandies.

Vendor success in this market, more than any before it, demands that DPers climb down off their technology high horses and learn to live amidst the non-DP peasants.

Kris Geisz is the traffic manager for radio station KCFM in St. Louis. She operates a mini system as an integral part of her job. Here is her story.

I've been working at radio and television broadcast stations for over six years now, ever since I received my B.A. in psychology. I first became interested in the business during college when I helped out part-time at the local TV station.

About a year ago, I was told the traffic manager was leaving and I was selected as her replacement. She was using a minicomputer system in her job, and I was very pleased to get the promotion, in part because of the opportunity to learn about computing systems.

I worked along with her for nearly two months before she left, to obtain the necessary training to properly operate the system. I was amazed at what this little machine could do!

Let me briefly describe our operation to you. Our business is beautiful music, 24 hours a day. But to keep body and soul together, we sell slots of radio time for 30- or 60-sec commercials. We call them "spots."

An advertising customer can specify a broad range of times that he or she wants for spots. A typical request is as follows:

"For the next 12 weeks: Wednesday through Friday, five spots during each of the periods 6 a.m. to 10 a.m., 10 a.m. to 3 p.m. and 3 p.m. to 7 p.m.; on Saturday, two spots from 10 a.m. to 3 p.m.; one spot any time Sunday."

Now then, to enlighten you as to why we use the term "traffic," can you imagine the job to be done in scheduling the spots when hundreds of accounts request special slots along with special restrictions, special arrangements and special priorities? And if business is particularly good and we are facing an overbooking situation, can you visualize the complication of rescheduling?

But, when the training was over and I became traffic manager, I felt quite comfortable with the system and was able to handle the scheduling function in just a few hours a day on the machine with very little problem.

Perhaps the major reason for this success is that the software guides me through the input and processing phases every step along the way. Since I interact directly with the system via the console, the response is instantaneous. The system is practically foolproof.

The Human Connection

I've heard about how new users are fearful of a computing system: concerned about losing their jobs, afraid they do not have the knowledge to understand or operate the system or negative about the ability of the system to perform.

I never had these problems. I have always felt relaxed with the machine, related easily and believed I had the aptitude to handle the job.

As a matter of fact, I feel mighty good about my abilities to perform because of my knowledge of the machine's capabilities and operation. When you think about it, I guess I'm pretty valuable to the radio station because I'm handling (with the mini) the work of probably three people.

We use the "slot inventory file," which provides the final list of spots sold to generate the hard-copy "log" — the master schedule of operations for the station. We use the same data base to publish schedules for our customers, financial reports, sales reports and even to generate customer invoices.

Oh, it's not all peaches and cream. I have problems occasionally, but they are generally under control. I can't recall when the Wang Laboratories, Inc. computer was ever completely out of commission; Wang's maintenance people are responsive and do quite a good job. And Viacomp — it's their software — has been handling my questions properly and promptly.

I guess my biggest problem has nothing to do with the machine system. It occurs when business is booming and I can't get enough machine time to handle the scheduling of spots.

There is no question that this minicomputer experience has been extremely valuable in building my career in the radio and TV business. But you know, sometimes I wonder. Tell me, do you think that I have the talent necessary to become a programmer?

Epilogue

"For immediate release to all DP news media: Radio broadcast station KCFM of St. Louis has announced the third anniversary of the operation of its automated management system.

"During this period, the station achieved recordbreaking advertising sales and reached its highest FM listening ratings in its history.

"The station uses Wang 2200 computer equipment and Rapid software, a comprehensive data base management system designed expressly for radio and television broadcast stations by Viacomp."

Squibs like this one cross my editor's desk hundreds of times a month. They focus on the grey, dry, objective generalities of the business and technology of our industry and ignore the victories and despairs of the humans that are deeply involved.

The small business market is tough, really tough. But the industry will make it through, with the dedicated efforts of the Goldmans, the Bornfleths, the Larimores and the Geiszes.

These people are the real pioneers of the American technocracy and, without intending to be chauvinistic, they are the unsung heroes who have made this country so great.

Se tu finis.

System 250 Offers a Challenge to Program Inventories

The System 250 is not a beauty. In appearance, the Plessey Telecommunications system looks like a collection of 19-in. racks thinly covered over.

And yet, this new powerful computer from England seems to be posing the biggest question in 20 years to the DP world. It certainly is something that has to be studied by anyone who is considering potential breaches of security and how to avoid them in computerized operations.

The Taylor Report
By
Alan Taylor, CDP

The System 250 has already attracted some tension in the appropriate circles here. For instance, its security architecture has been commented on by the National Bureau of Standards as well as by the Association of Computing Machinery in its December 1976 computing surveys.

However, neither of these institutions has gone to the heart of the problem, which is concerned primarily with the cost of security.

No Privileged State

The security arrangements of the System 250 reportedly "make it impossible for programs to create authorized capability values and thus gain illegal access to [other programs or data]."

What the 250 has done has been to abolish the so-called privileged state which is a characteristic of current computers and which has been so since the beginning of operating systems.

The privileged state concept grew out of the idea that the programmer couldn't be trusted, but the machine designer and systems designer had to be trusted, whether we liked it or not.

So, some ideas and some capabilities were restricted to one overall, all-powerful area.

The weaknesses of this approach were not found in performance, where the resulting control of certain sensitive areas, in fact, improved both operational and program preparation capabilities to the extent that debugging and operations could take place simultaneously.

The privileged state concept can therefore be seen to have had a major impact in the development of general-purpose computers capable of serving a corporation or a department in a realistic way by being able to operate, test and even attempt to audit themselves.

At the time the privileged-state ideas came out in the 50s and their capabilities were being realized in the late 60s and early 70s, there was little real interest in security.

The general belief was that performance and capability were necessary and that if security was a consideration, other than trusting the programmers and systems designers, it came second, to be patched on top of a performance design.

That situation is no longer thought to be controlling. Now — after the experiences of the last few years, after the studies of the weaknesses of computer auditing, of the ease of being able to intercept the privileged state and of being able to access destructively or silently access programs, data and operating schedules — it is clear that security has to be something a lot more than just a patch on an already-designed system.

This is where our present quandary comes in. Our systems — that is, hardware systems — are all rarely based on performance designs. The main one — that of the System 360 and its various followers, IBM or otherwise — has set the tone and currently sets the standard. A history of the 360 shows fairly clearly that the ability to change architectures is being restricted more and more by programs using the old architecture.

Even changing a language, such as changing from Cobol to PL/1, was found to be outside the power of IBM at its most powerful — in the 1968 era.

There is no question that Cobol is technically not the best language, even for business purposes, that can now be designed. It is basically a 20-year-old language with additions.

But Cobol's power, like the power of Fortran, Basic and even PL/1, comes from the people trained in Cobol and the Cobol inventory of programs.

It is characteristic of computers that they are able to use programs long after the programmers have gone and forgotten the logic underlying them.

And even when a program has gone through a series of developments by a number of designers so that no person ever really knows the program itself, it is still a useful item capable of serving the corporation or agency faithfully — but not capable of being changed in more than minor ways.

Absentee Problems

This absentee-designer situation has many of the same problems as the absentee landlord situation that was a major contributor to the worldwide breakdown of the colonial empires of European nations.

As an historical analog, our situation today is one in which our program empires are running practically all of our DP operations. They are running them based on systems where security is simply an add-on or patchwork, not a built-in capability.

Now the Plessey system comes forward with its totally different "capability" design. It has other things going for it also, such as a fabulous 40-year-odd meantime between failure.

Security Questions

However, the 250's treatment of security — as something that has to be built in — raises a whole new situation with regard to security. It opens up opportunities both for users of the system and for others seeking to understand what security is really about.

Different types of address space, such as the program segment where the user has the right of execution only, a program segment where there is a read-only data segment or a read-and-write data access, subroutine programs, and hardware devices are used.

Programs do not have access to the capability loading structure where capability segments can only be created by specific capability manipulation instructions.

Whether the Plessey system will really work, I can't personally say at this time. I do know that some of the leading experts in the field seem to think it will. They also view it as a major step forward in security which avoids the weaknesses of the privileged state machines we are currently using.

And I do know that if the System 250 doesn't do the best for security, then some other hardware design will do so in the near future.

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CDC Adds Cyber 18 Software

MINNEAPOLIS — Control Data Corp. has introduced an interactive terminal-oriented software system (Itos), currently capable of supporting 16 concurrent users, and a dozen interactive application modules for its Cyber 18 family of minicomputers.

The application modules — "the first in a series . . . for a wide range of small computer users" — include eight for distributors and four for manufacturers, CDC said.

The distributors' packages include order entry and invoicing, accounts receivable, inventory control and physical inventory, general ledger and payroll, purchase order processing and accounts payable, a spokesman explained.

Manufacturers are offered programs for material requirements planning, bill of material processing and work-in-process and routing operations. All the software is modular so users can build the kinds of control systems they want, the spokesman added.

Monthly fees for the separate software modules range from $10 to $27, in addition to initial charges of $150 to $750. The Itos software costs $200/mo and has an initial fee of $1,000.

The software was designed to run on both Cyber 18-10 and 18-20 configurations; these can be leased starting at $2,410/mo and $3,888/mo respectively.

'Decs' Eliminates Keypunching, Backs On-Line DOS Data Entry

RICHMOND, Va. — The Data Entry Control System (Decs) package from The Computer Software Co. (TCSC) provides an on-line alternative to keypunching, according to the vendor. Decs uses local and remote IBM 3270 or plug-compatible terminals to handle data entry, verification and batch totaling. It runs on any IBM 360/370 under DOS, DOS/VS or TCSC's Edos or on any non-IBM CPU capable of emulating the 360 instruction set and running an IBM operating system, including the Univac 9070, a spokesman noted.

Decs is cost-effective, he claimed, particularly when inexpensive 3270-type terminals are used in place of multiple IBM 129 keypunches.

The 3270 screen can be formatted to match the arrangement of the original source document or laid out according to the preference of the terminal operators. In either case, the output can be formatted to match previously keypunched data so no changes in user programs are required, the company said.

The major advantages of Decs compared with conventional keypunching are operational rather than economic, the spokesman suggested. With Decs, responsibility for correct and timely data preparation can be shifted to originating departments.

By locating input terminals in the user departments, personnel familiar with source documents work directly with the system. Batching and physical transfer of the documents, with its potential for delays, losses and misunderstandings, is eliminated, he said.

Decs requires the user to specify the edit codes for each field; these criteria are shown on the screen so the operator knows how the system will accept them. Commands and error messages are in simple English to further simplify the operators' responsibilities, the spokesman added.

After a batch has been completed, totals on all numeric fields can be obtained immediately. In some cases this batch total facility can eliminate the need for verification, he noted.

Decs requires a 24K to 26K partition in main memory. Its system files reside on IBM 2311-, 2314- or 3330-type disk drives.

The software costs $5,500, which includes two years of maintenance, but various lease plans are also available. TCSC is at 6517 Everglades Drive, Richmond, Va. 23225.

'RT-11X' Aids PDP-11 Functions

PORTLAND, Ore. — RT-11X from the Life Support Systems Group Ltd. (LSSG) is a collection of modifications and enhancements to Digital Equipment Corp.'s RT-11 (Version 2C) operating system for the PDP-11.

It increases the system's capabilities and makes the operator's work easier, a spokesman claimed.

Package features include an improved user-defined command language, extended error diagnostics, programmable console terminal capabilities, a "semiresident" line printer spooler and correction of "all known errors."

Changes in DEC's Concise Command Language (CCL) allow direct monitor commands for most system utility programs. Any unrecognized monitor command is passed to an RT-11X utility that attempts to translate it.

Support for batch commands means the user can compile, link and execute a Pascal, Fortran, Sail or Macro file with just one command line, he added.

Describing the extended diagnostics, the spokesman noted errors under RT-11X are reported in full words rather than in abbreviations.

The package's line printer spooler can run as a pseudo-foreground task of the single-job monitor, at maximum printer speed, for concurrent listings and computation, he continued.

The error corrections in the LSSG software are said to include "solutions to the Batch Time/$Data problem" as well as all "SPR corrections."

RT-11X is available only to current licensees of RT-11 Version 2C. It ranges in cost from $200 for a single-computer binary license to $1,500 for binary and source code for multiple locations.

The software is distributed on user-supplied media, LSSG said from 2432 N.W. Johnson, Portland, Ore. 97210.

'Chekmark' Boosts 'Mark IV' Security

LOS ANGELES — Installations working with the Mark IV file management system from Informatics, Inc. can track, audit and control use of the data files in both the programming area and user departments with the Chekmark security software, according to its vendor, Computer Infomatrix, Inc.

The package uses an integrated set of routines that control access to the Mark IV system. These routines monitor who is using the Informatics software, how they are using it and what data items are being used, a spokesman explained.

With Chekmark, every programmer and user is assigned a password and an authorization level according to need. Each Mark IV item to be protected has "access," "update" and "library maintenance" levels of authorization, he said.

When a Mark IV job is submitted, the user includes his name and password as part of the request. If Chekmark verifies the authorization is legitimate, processing continues.

If the user is not authorized to do the submitted work, the requester is denied access to the data and the job is terminated, the spokesman added.

Audit Trail

The package provides half a dozen management reports showing such things as date and time of system usage, who has used the system, what files were accessed and what type of work was done. An audit trail of last-date-used and last-date-changed is provided for all Mark IV items, he said.

Since the report generation routines are coded in Mark IV, any use with valid authorization can modify or extend the formats provided with the package, he added.

A spokesman at Informatics acknowledged that Mark IV does not provide password protection.

Chekmark can be used on Mark IV 234/244/260/270 systems operating on IBM 360/370 equipment under OS, OS/VS1 or VS2, Computer Infomatrix said.

The security package costs $7,950, the company added from the Eighth Floor, 10850 Wilshire Blvd., Los Angeles, Calif. 90024.

HIS 'Funds' Eases Transition to EFT

WALTHAM, Mass. — An integrated on-line financial information management system for Honeywell Information Systems, Inc. Series 60 Level 66 mainframes will help commercial banks and thrift institutions reduce costs and prepare for electronic fund transfer (EFT) systems, according to HIS.

The system, called Funds, is transaction-driven and provides real-time updating of master files affected by customer activity, according to a spokesman.

Funds is based on Honeywell's Integrated Data Store (IDS) data base management system and its Transaction Driven System (TDS) software.

Funds' first five modules, which can be integrated with EFT applications and technology in the future, will be available in the third quarter of this year.

The administrative and control module, required for use of any of the other four, provides an audit control mechanism and administers the procedures for handling accounting, balancing, reporting and historical processing, the spokesman explained.

License for this module is $200/mo or $6,250, he said.

The customer profile module consolidates all customer names, addresses, descriptions of account relationships and other data in a single file. It costs $400/mo or $12,500.

The savings accounting module was designed to handle a variety of savings plans.

License to use the savings accounting module is $700/mo or $21,850.

Book Discusses On-Line Systems

ROCHELLE PARK, N.J. — Described as useful to the "fairly sophisticated" systems analyst or designer or graduate students in system design, *Quantitative Methods in On-Line Systems* by J.A.T. Pritchard has been published by the National Computing Centre (NCC) in the UK and Hayden Book Co. here.

The 320-page cloth-covered book costs $14.95, Hayden said from 50 Essex St., Rochelle Park, N.J. 07662.

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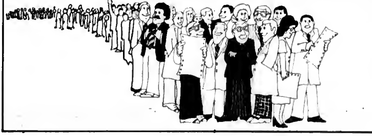

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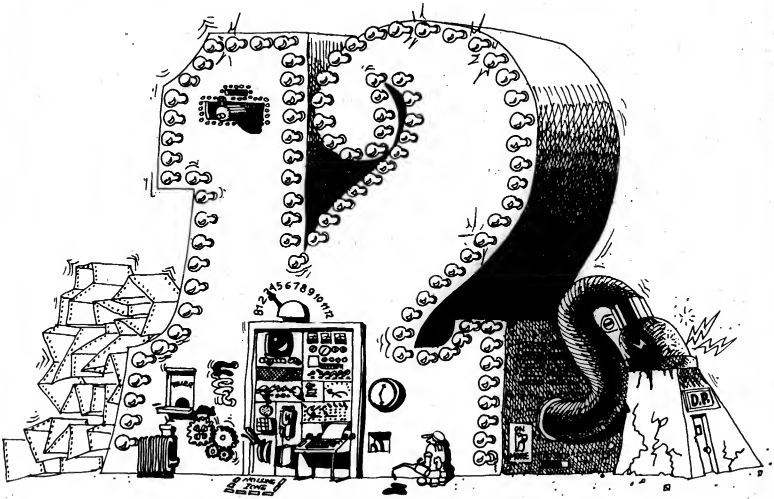

Software Enhances Xerox 1700 Usage

ATLANTA — A trio of programs from Escape Ltd. enables users of Xerox 1700/1710 or Diablo 1610/1620 terminals connected to a CPU that supports Fortran IV to get DP work done more quickly and easily and to get text output produced more neatly, a spokesman claimed.

The programs, available separately or as a package, include a fast processor, a feature control facility and a print justification routine.

The Fast Processor program is said to take any data as input and print it on the Xerox or Diablo terminal, tabbing through blank spaces and lines to save time and printing backward to eliminate carriage returns. The program can reduce a user's connect time as much as 50%, the company claimed, depending on the material being printed.

The Feature Control program prompts the user at the keyboard in the setting of margins, tab stops, horizontal and vertical spacing values and ribbon color. Without such conversational help, the user would have to look up the coding for each of these choices, Escape said.

The Print Justification program produces output to user-defined specifications. Hyphenation is not supported.

Justification is achieved through the terminals' ability to adjust print positions in increments of 1/120 of an inch, which permits spacing between and within words.

The programs are available on paper tape or punched cards. The Fast Processor costs $110; Feature Control costs $45; Print Justification costs $155. If all three are acquired, the total cost is $225.

Escape can be reached through Box 18797, Atlanta, Ga. 30326.

Data Dictionary Updated by MSP

LEXINGTON, Mass. — Release 1.4.3 of the Datamanager data dictionary from MSP, Inc., includes enhancements in the commands it supports; in the use it makes of system resources and in the privacy and security areas, according to a spokesman.

The LIST, DOES, PROTECT, GLOSSARY and REPORT functions have all been enhanced. GLOSSARY, for example, has been extended to work on alias names and member types, he said.

A new command, REPORT HIERARCHY, provides a "nonexploded" report on a member followed by a similar report for each member directly or indirectly referenced from the first number, he added.

The system member type has been extended to include subsystems and the OS version of the packago now accepts fixed, variable or undefined input record lengths.

CPU utilization has been improved and the use of additional I/O buffers under OS has resulted in reductions of 25% in CPU time and 45% in the number of I/O accesses during test runs, the spokesman claimed.

Users in an OS environment are also able to use concatenated input files. Changes have been made in output processing as well; an optional feature allows users to define the number of lines they want printed on a page, he said.

The data administrator can establish global protection against illegal access to the dictionary, the spokesman continued. Concurrent updating is prevented and an "update lock" has been included to prevent updating of a dictionary that has been "corrupted" until the corruption has been investigated and cured.

The price of Datamanager starts at $9,900, but users typically spend $20,000 acquiring all the options they want, the spokesman said.

The software is available from MSP at 594 Marrett Road, Lexington, Mass. 02173; from MSP Canada in Willowdale, Ont.; and from the parent company, MSP Ltd. in London, England.

Multitasking 'Total' For Varian Users

IRVINE, Calif. — The implementation of Cincom Systems, Inc.'s Total data base management system for Varian Data Machine users has been significantly enhanced with the introduction of Total-C, a multitasking program feature, according to a Varian spokesman.

Aimed at the multiuser environment, the feature separates Total from the user's program. A lockout feature allows more than one task to use the same file in an update mode, blocking only attempts at concurrent updates of the same data.

As with the Total "Central" implementation on which it is based, Total-C removes most of the Total code from the user's space. One copy of the data base software serves multiple users and the savings may be as much as 5000 word/user, the company estimated.

Files developed for current Total users are compatible with Total-C. Few programming changes are required to convert present users to Total-C's capabilities, the spokesman added.

Developed for Varian by Cincom, the Total-C package costs $9,500. Current Total users can upgrade their systems for $1,400, Varian said from 2722 Michelson Drive, Irvine, Calif. 92713.

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Information Flow Analysis — Part 2

Early Study May Show User Won't Need Full DBMS

By Robert B. Chamberlain
Special to Computerworld

A previous article [CW, May 23] described the first-level benefits of an Information Flow Analysis (IFA) conducted prior to selection of a data base management system (DBMS). But the value of such documentation is only partly shown in the data base file design effort.

As the IFA is completed and the flows or paths for each data element are examined, some rather remarkable things are frequently observed.

Forms, for instance, are found to record elements which are not even entered into the system in either a manual or automated manner or — as is even more frequently the case — elements are recorded and entered into the system, but never come out on a report.

The latter indicates environments which are at least willing to discontinue use of a report, but reluctant to quit gathering data or unsure of the side effects of removing irrelevant data from a system.

Another frequent discovery is the extent of the discrepancy between the official list of forms possessed by an organization (a list which is usually maintained not for documentation, but for ordering more forms from the printer) and the informal forms created by hand or roughly typed and whose existence is sustained by copying machines.

Every organization has the latter. A rough calculation of the state of its DP readiness is the proportion of informal forms to formal ones; the higher the proportion, the greater the indication that the DP department cannot meet user needs.

Several Side Benefits

Several solid side benefits from the long-range approach to data base design can be seen.

One benefit is that an organization can now make not only the package decision with a great deal more insight — it also has the ability to determine in depth whether it should be a data base shop or not, a decision precluded by the *which* package approach.

Secondly, the same documentation which enables an organization to intelligently pursue the DBMS question will also serve it well should it not go data base. In some cases, the creation of a solid data dictionary in itself provides the capabilities that management thought possible only through a DBMS package.

The organization which "can't afford the time" for an IFA and service analysis is the one which can't afford *not* to take the time.

The organization which is contemplating data base and whose documentation is current is truly fortunate (and rare). Its task is to transmit the existing documentation into the new format, a mechanical task which provides a new means of accessing documentation to parallel the advent of new access methods to the data itself.

The IFA is a study of "what is," illustrating a crucial aspect of the data base efforts; not to replay the current application programs, but to create a study of the existing flow of business as reflected through the media of business — the paper on which data is recorded.

Data base design can now begin in earnest by associating data elements which are available from current sources with those which were identified in service analysis as being essential to the provision of the requested services, but which are not currently being collected.

(Continued on Page 21)

CA 3/05 Gets Floppy DOS

IRVINE, Calif. — The 3/05 Floppy Disk Operating System (3/05 FDOS) for Computer Automation, Inc.'s (CA) LSI-3/05 Naked Millicomputer is said to provide users with all the tools they need for rapid software development while reducing main memory requirements.

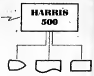
The package includes editing, assembling, linking and debugging facilities. In a typical development environment, system and user programs reside on diskettes until the operator loads them into memory for execution, CA said.

The floppy disk operating system maintains files in the same format as the full-scale operating system on the higher performance LSI-2, permitting file transfers and upward growth, a spokesman added.

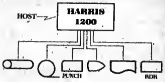
The 3/05 FDOS operates on an 8K LSI-3/05 with a teletypewriter, an operator console and a dual floppy disk subsystem with 243K byte/disk, he noted.

There is a one-time charge of $500 for 3/05 FDOS, the company said from 18651 Von Karman Way, Irvine, Calif. 92713.

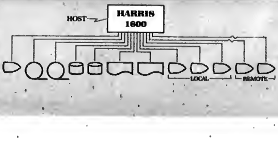
Harris 500
Intelligent Remote Batch Terminal



Expanded Harris 1200 Remote Batch Terminal supporting multiple peripherals into mainframes such as IBM, CDC, UNIVAC and Honeywell.



Interactive processing from local or remote CRT terminals combines with concurrent remote batch to a host computer providing optimal balance of processing power to each location.



ICP Eyes Minis, Small Systems

CARMEL, Ind. — International Computer Programs, Inc. (IPC) last month began publishing a semiannual software directory devoted to products intended for minicomputers and small business systems. Now the company has announced an extension of its ICP Interface series of smaller publications, devoted to the same user base.

The mini/small business directory was based on programs for the small users already listed in the long-established *ICP Software Directory*, but a spokesman noted the base was expanded to include 1,200 to 1,400 products in the first issue. The latest directory costs $65/yr, he added.

According to present plans, the software directory for medium-, and large-scale CPUs will continue to be published each January and July and cost $100/year, while the mini/small system directory will appear in April and October of each year.

The first mini/small business system issue of the Interface series, scheduled for distribution in July, will include editorial material as well as descriptions of some products and some software houses that work with the small system users.

The Interface publications are available on a controlled circulation plan. The initial audience for the mini/small systems issues — expected to be users of large-scale CPUs with mini or small system "satellite" operations, users of stand-alone small systems and consultants — is predicted at 30,000, ICP said from 1119 Keystone Way, Carmel, Ind. 46032.

Edutronics Has TA Guide

KANSAS CITY, Mo. — The Edutronics Group has released "I'm OK — You're OK," a multimedia programmed learning curriculum based on the book with the same title by Dr. Thomas A. Harris.

Made up of 11 course modules, the curriculum was designed as a practical guide to transactional analysis (TA), the theory covered by Harris' book, which examines and analyzes the social interactions (transactions) between people, Edutronics said.

Presented and narrated by Harris, the curriculum can be very useful to business organizations, providing a means of improving management performance at all levels through increased individual and group interpersonal and communications skills awareness, a spokesman claimed.

Role Playing

Role-playing dramatizations and case studies effectively demonstrate the concepts in Harris' book, he said. Discussion periods following each course module allow participants to react to the principles presented, he added.

"I'm OK — You're OK" is part of a behavioral science library of human factor courses which Edutronics said it is expanding to meet growing interest in people problems.

Edutronics is at 3435 Broadway, Kansas City, Mo. 64111.

MAP Converted Into ANS Cobol

MILWAUKEE — General Electric (GE) MAP source code is the input and IBM ANS Cobol is the output of a translation package from DASD Corp.

The software runs under IBM's OS/VS environment and translates a typical MAP program in approximately 7 sec of CPU time, a spokesman claimed.

The resulting Cobol Procedure Division uses section-level code to accommodate the translation of MAP internal sorts having I/O procedures. A common print routine is inserted into each report-writing program to convert GE's carriage controls to those supported by IBM.

Various warning messages are provided as part of the Cobol listing to highlight problem areas within the attempted translation. Manual corrections may be needed in response to these messages, the spokesman noted.

The translator is available under license for $11,000. DASD is at 8705 N. Port Washington Road, Milwaukee, Wis. 53217.

Side Benefits Come From IFA

(Continued from Page 20)

A circumstance parallel to one found in the IFA will now appear. The service analysis will provide evidence of those elements which are neither currently needed nor projected to be needed, a nice savings for any installation.

It also identifies without confusion, working with the user, those elements which are necessary for the delivery of the new services in an organized manner.

In conclusion, it can be seen the IFA is an important device in the initiation of any systematic data base effort. Any potential user should become fully conversant with its advantages.

Chamberlain is a senior consultant with CACI, Inc — Commercial in New York

Clarification

More information about the course described in "Physical Handicaps Overcome by Programmer Trainees" [CW, May 9] and the preparatory work it required is available from author Drew Bourrut at Bourrut Consulting Corp., 21 Friendly Way, Smithtown, N.Y. 11787.

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	No of users reporting	Overall satisfaction	Throughput/Efficiency	Ease of installation	Ease of use	Documentation	Vendor technical support	Training
ADABAS Software AG	4	33	33	33	35	20	28	25
Datacom DB, CIM	8	33	34	30	34	23	34	31
DBOMP IBM	48	30	26	24	27	25	27	24
DL/1, IBM	29	26	24	23	24	24	25	26
DMS-II, Burroughs	5	38	40	36	36	28	30	32
GIS, IBM	7	24	21	2.1	30	27	26	23
IDMS, Cullinane	**17**	**3.8**	**3.3**	**3.4**	**3.6**	**3.0**	**3.6**	**3.5**
IMAGE, Hewlett-Packard	11	36	33	37	32	28	29	27
IMS IBM	33	29	24	22	25	28	28	29
INQUIRE, Infodata	6	32	22	2.7	30	25	28	26
Model 204, C C A	3	37	33	33	33	27	33	27
SYSTEM 2000, MRI Systems	21	30	23	29	3.5	24	27	21
TOTAL, Cincom Systems	113	35	31	34	34	28	30	28

*All weighted averages are based on a scale of 4 0 for Excellent

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Businesses Face Cost 'Upheaval'

Wats Changes Seen Having Impact on Larger Users

NEW YORK — The newly filed tariff for Bell's Wats is the most massive restructuring in Wats history and will have a profound impact on most larger businesses transmitting data as well as voice communications, according to a consultant here.

"With the Wats changes coming on the heels of the elimination of Telpak and the boost in Dataphone rates, most business users face an impending upheaval in their services and costs, and only a very few have budgeted for the impact," according to Harvey L. Poppel, senior vice-president of Booz Allen & Hamilton.

The new tariff calls for the elimination of relatively fixed-cost, full-period pricing and the establishment of a tapered 'usage-sensitive rate structure [CW, May 16].

The alternatives for those who use Wats at night primarily for polling data terminals and transmitting batched facsimile data include choosing leased lines or turning to the specialized common carriers, Poppel said.

The costs for leased, long-distance lines are coming down, especially multidrop or multipoint lines, he explained.

Another change which could take place as a result of the rate restructuring, Poppel said, is an increase of data traffic being diverted from Wats to satellites.

A more subtle change which could take place after the tariff changes become effective is the increased reliance on data communications between terminals because of the high cost of voice communications, Poppel said.

In that event, Poppel said, there will be more data terminals needed by users and AT&T will face the threat of losing some voice communications revenues, he added.

Poppel and the consulting firm staff have subjected the rates filed with the Federal Communications Commission to computer-assisted analysis and have drawn some general conclusions.

For example, heavy current users of Wats, especially those with fully loaded fixed-cost Wats lines, face substantial increases in their costs (ultimately as much as 30%).

At the other extreme, smaller business locations with insufficient usage to justify Wats currently will find some of the new services within their reach, Poppel said.

Significant Migrations

There also will be some significant migrations to and from Wats:

- Heavy users of longer-distance Wats will want to take a hard look at leased line alternatives, especially with recently announced sharp reductions in those rates.
- Organizations that use Wats for data and facsimile communications, for example, will find it tougher to piggyback these specialized usages on Wats and will be seeking other alternatives, such as specialized data services.
- Users of some of the longest distance U.S. calls will probably be switched from Wats to toll,
- Organizations that use nighttime Wats for solicitation purposes might have to rethink the economics.

(Continued on Page 26)

With GRI Hardware Upgrades

GRI System 99 Talks Back to IBM 3 Under BSC

N. BRUNSWICK, N.J. — Two-way communications between any IBM 3 CPU equipped for telecommunications and the GRI Computer Corp. System 99 reportedly can provide small businesses with a cost-effective method to solve their distributed DP needs.

Using GRI's Model 9666 IBM channel adapter, Model 9665 asynchronous modem and/or Model 9650 communications package, System 99 users can effect this intercommunication with any IBM 3 that has 1,200 to 4,800 bit/sec bisynchronous communications facilities, GRI claimed.

For IBM 3 users who need remote processing facilities or real-time capabilities, GRI's System 99 provides additional telecommunications capabilities and an alternative to upgrading the 3.

The capability of communicating with IBM equipment either asynchronously or bisynchronously is unique to the GRI System 99, according to a spokesman.

This reportedly presents cost-reduction possibilities for IBM 3 users who previously limited their communications because of the high cost of implementing both asynchronous and bisynchronous features on the IBM 3.

Distributed minicomputers and many terminals require specific communicating modes and are not capable of choosing their mode. The GRI System 99 matches the IBM 3 user's existing communications capabilities with no need to upgrade the 3, according to the firm.

'Disguised Transmission'

GRI's 1,200 bit/sec Model 9666 IBM channel adapter enables IBM 3s with IBM's 1,200 bit/sec bisynchronous transmission features to communicate with a System 99 equipped with the Model 9650 communications package and 9665 asynchronous modem, GRI said.

What IBM 3 users refer to as 1,200 bit/sec bisynchronous communications is actually a disguised asynchronous transmission, the spokesman contended.

IBM uses an unusual scheme in these machines, he said.

With a device referred to as an internal clock, IBM adapts a synchronous CPU port for use with a 1,200 bit/sec asynchronous modem and, conversely, it takes the asynchronous modem and converts the data side into a bisynchronous signal, he explained.

Previously announced as a means of communicating bisynchronously between a System 99 and IBM's 3741 remote entry device, GRI's 9650 now enables intercommunications between the System 99 and any IBM 3 CPU having the 1,200 to 4,800 bit/sec binary synchronous communications (BSC) feature, he said.

Both GRI communication features reportedly provide for the control of remote System 99s from the host 3 CPU.

Programs, procedures and data files can be sent to remote, unattended System 99s, executing the procedures and the return transmission of the processed files or reports to the IBM 3, the company said.

System 99 communication features permit on-line data collection, transmission of off-line batched data or on-line batched data transmission, GRI noted. Interactive communications are possible between the System 99 and its own terminals with the company's Interactive RPG-II, it stated.

Transmission is in half-duplex mode over switched, leased or private line, and either Ascii or Ebcdic codes may be transmitted.

The communication features from GRI allow the System 99 to serve as a compatible replacement or upgrade for any IBM BSC terminals (having transmission rates from 1,200 to 4,800 bit/sec in distributed DP networks using most IBM computers, GRI claimed.

The Model 9666 channel adapter is priced at $600. It must be purchased with the Model 9665 modem, which costs $645.

It is used in conjunction with the Model 9650 Communications Package, which sells for $4,335, GRI noted from 870 Georges Road, N. Brunswick, N.J. 08902.

SPC Files Lower Cost Tariffs for Private Lines

BURLINGAME, Calif. — Southern Pacific Communications Co. (SPC) recently filed changes in its private-line services tariff structure with the Federal Communications Commission (FCC).

Subject to FCC approval, the rate changes expected to go into effect on Aug. 10 will give all users of SPC's private lines on the long-term basis a price break, according to an SPC spokesman.

In what was called "a move to increase stability in the telecommunications pricing area," SPC intends to offer the leased-line services for either six-month or 24-month minimum commitments, rather than the present 30-day maximum contracts, the spokesman said.

The longer-term services will be billed at rates below the present commitment prices. If a user wishes to discontinue the services, he can notify the carrier any time prior to 15 days before the end of the service period, the spokesman noted, adding terms will otherwise be renewed at the then-prevailing price.

'Significant Departure'

SPC has called the proposed changes "a significant departure from previous tariff practices in the industry," which "sharply [contrast] the pricing arrangements of the monopolistic carriers."

Charges for a communications link between New York City and downtown Los Angeles, for example, now cost users $996.31 each month on the standard 30-day commitment, plus $140/mo for termination and other standard channel-associated costs, the spokesman noted.

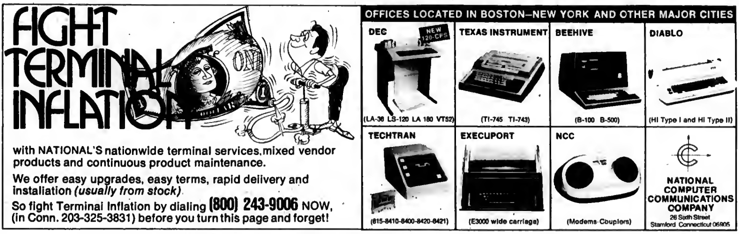
Under the new tariff structure, users who opt for a six-month minimum of private-line services from SPC will be charged $913.37 while users who want a 24-month subscription will be charged $889.77 for the same service, in addition to the $140/mo standard charges for termination, etc., he said.

A New York to Chicago link now costs $320.61/mo and will cost $287.10/mo on a six-month minimum commitment and $277.60/mo on a 24-month minimum contract, the spokesman stated.

Short-distance communications charges between New York and Boston now cost private-line services users $108.88/mo and will cost $91.23/mo for six-month subscribers and $89.11/mo for users who want the services for a minimum of two years.

The $140/mo charge is for service between the downtown areas of cities served by SPC. Local-channel charges are higher for users outside of these central-city areas, according to the spokesman.

The SPC spokesman said about 10% of SPC's private-line users transmit data exclusively.



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As Technologies Merge

Role of Communications Manager Seen Expanding

By **Ronald A. Frank**
Of the CW Staff

TORONTO — Because digital and analog technologies are merging and voice and data services are becoming indistinguishable, the role of the telecommunications manager is expanding to cover multiple services within the corporate business environment.

This was the recurring theme expressed by speakers at the annual conference of the International Communications Association here recently.

Today's technological changes require a full and integrated approach to corporate communications, according to Robert Scrivener, chairman and chief executive officer of Northern Telecom Ltd.

Delivering the keynote address, Scrivener said communications managers want reliability, systems thinking, modern equipment and service while optimizing corporate investment in both the short and long run.

Adequate Planning Necessary

"I don't know if you have adequate systems planning and design skills on your payroll or whether communications means voice, all speeds of data, broadband, and, yes even the computers, microprocessors and all the terminals that are or can be connected to your corporate network.

"If all these elements are not part of your job, they should be," he told the conference attendees.

As computer and voice communications come closer together, it will be more difficult to tell the players apart.

As an example, Scrivener said his company is now working with a large U.S. company to develop the concept, functions and design of the "workstation" of the future.

"When you know you can bring a low- to high-speed digital bit stream on a couple of pairs of wires or fibers to a work location and plug in many types of terminals, then you start putting together layouts that are aesthetically satisfying, economic in operation, very flexible and all tied into the massive memory, speed and capacity of the digital world," Scrivener said.

Digital technology will maximize the potential of integrated circuit and software technology. To telephone companies, a digital switch won't cost any more than the equivalent analog switch, but an all-digital network will reduce operating and capital costs by at least 20% compared with analog facilities, he said.

"Your companies can't wait, but must have voice/data-compatible networks now, in order to compete and cut costs. The digital savings will depend on each situation, but digital flexibility opens all future options," he said.

More Services

In keeping with Scrivener's integrated approach, several sessions at the conference stressed the importance of expanding the corporate telecommunications function to include a wider variety of services. And several speakers raised the idea that corporate telecommunications should be viewed and run as a profit center instead of an overhead operation.

While telecommunications managers were talking of expanded horizons, an AT&T official said the telephone company will no longer contact a single corporate source in order to try to provide its services.

Archie McGill, director of market management and development business, told the conference that Bell marketing efforts are being geared to problem solving.

As part of this effort, telephone representatives must understand all facets of the corporate communications needs, he noted.

In order to implement this concept, it might be necessary to deal with different people within the corporation, McGill said. "My view is that it is impossible to deal with only one person. We will have to deal with people at all levels of a corporation," he explained.

This new approach is not intended to avoid the telecommunications manager's responsibility, but instead to give Bell representatives a broader exposure to corporate problems.

In this connection, account salesmen from local operating companies are being trained with specific industrial orientations, McGill said.

ICA Elects Officers, Outlines '78 Plans

TORONTO — Thomas Hogan of Monsanto Co. was elected president of the International Communications Association (ICA) at the recent annual conference here.

Other incoming elected officers of the user organization include Edward Vennum of LTV Corp., who is first vice-president; Wylie Deakin of TRW, Inc., elected second vice-president; Lloyd Isaacs of Chrsyler Corp., treasurer; and George Fallat of E.I. duPont, Inc., secretary.

Philip R. Evans of Ashland Oil, Inc. was elected to the ICA board of directors.

Certification Program Stressed

Outgoing president Raymond Reamer of IBM called on the ICA to initiate a certification program for telecommunications managers. Reamer outlined a "formal academic standard certification program in the management and operation of telecommunications systems.

"Telecommunications has been elevated to Cabinet-level status in government. It is certainly recognized as a profession. Why shouldn't the 'value added' by communications managers be measured, recognized and certified?" Reamer asked the conference attendees.

Reamer announced the ICA will hold a seminar in January in Orlando, Fla., dealing with "Telecommunications and the Office of the Future."

About 1,100 ICA members and others attended the annual conference while 100 carriers and vendors participated in the exhibition. The 1978 annual conference will be held in Las Vegas next May.

About 360 corporations are members of the user organization.

Information about the ICA is available from Roger Aude, executive secretary, Box 836, Bellaire, Texas 77401.

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ASI Nucleus 4000 Transforms Phones Into Terminals

WATERTOWN, Mass. — American Systems, Inc. (ASI) has introduced a voice-response telecommunications system that reportedly transforms pushbutton telephones into remote terminals.

The Nucleus 4000 voice-response concentrator allows data retrieval directly from a computer. It stores recorded human speech and has a realistic vocabulary limit of about 12K words, a company spokesman stated.

The voice response feature can function in a concurrent mode with CRTs, teleprinters and other communications devices, he said.

It can service up to 48 communications lines, although custom configurations can be designed to handle more, the spokesman noted.

Modems, an I/O multiplexer, minicomputer communications processor, vocabulary storage on disk, teleprocessing software and a CPU interface are included in the basic front-end system, ASI stated.

Networks of Nucleus 4000s can be configured under a packet-switching software system called ASI/NET to reduce communications costs, the company claimed. The price for the basic voice-response concentrator system is about $65,000 and system cost is configuration-dependent, the spokesman said from 123 Water St., Watertown, Mass. 02172.

Spectron Transceiver Eases In-House Links

MT. LAUREL, N.J. — Spectron Corp. has introduced a stand-alone digital transceiver designed to facilitate full-duplex communications between terminals and computers over distances up to 10,000 feet with standard four-wire telephone cable.

The DT-401 reportedly eliminates the need to use modems and private lines to communicate within local facilities.

The transceiver operates like a conventional modem over private or in-house circuits, with one unit required at each end of the communications line, Spectron said.

Both multipoint and point-to-point arrangements can be accommodated. Maximum line length with data speeds up to 9,600 bit/sec is 10,000 feet; up to 19.2 kbit/sec can be achieved with less than 7,000 feet of cable, according to the firm.

Diagnostic Capabilities

Three loopback switches are provided for diagnosing communications problems. Two line loopback switches must be switched together to turn the line back on itself in both directions to test the local unit as well as the line from the distant end, Spectron noted.

The interface loopback switch turns the digital side back on itself for verifying the entire channel and a test switch provides further diagnostic capability which inhibits the business machine and sends a constant zero level to the distant end, the company said.

Four indicator lamps are provided as an aid to the operator, it added.

The DT-401 can be connected to any terminal or port with an RS-232C interface. It costs $540, a spokesman said from Spectron at Church Road and Roland Ave., Mt. Laurel, N.J. 08057.

Via West Offers Interface For LA 36 Decwriter II

PHOENIX — Via West, Inc. has an RS-232C interface for the Digital Equipment Corp. LA36 Decwriter II. It is said to permit plug-compatible substitution for DEC's LAXX-KG interface.

Via West's connector is supplied with cables, connectors and a mounting plate.

The device costs $45 from the firm at 2739 W. Palm Lane, Phoenix, Ariz. 85009.

Federal Screw Has Audio Response Multiplexer

TROY, Mich. — Federal Screw Works has introduced an audio response system which is said to provide audio output and Bell Touch-Tone input-handling capabilities for computer systems.

The Votrax LVM-70 is a microprocessor-based multiplexed system which can service four to 64 telephone lines, according to a spokesman. It can store a vocabulary of "any sounds made" in 16 sec on the basic system to 129 sec maximum, he said.

System features include variable word and message length, custom vocabulary consisting of words and phrases and a user-selected voice, he added.

The LVM-70 supports the Bell 407A, 407B and Bell 403-type units plus the Bell Transaction Telephone, Automatic Call Distributor and Call Director.

The system controller can simulate the operation of an RS-232C asynchronous terminal on the host computer's communications adapter, it claimed.

All transactions between the controller and the host are conducted using standard formats, the spokesman added.

Optional program modules include support of synchronous or asynchronous communications, local or remote connection to the host, buffered communications, transaction time-out and computer-down features.

A basic LVM-70 can handle four lines, has a controller, can store about 30 words and costs $8,750. It includes an RS-232-compatible serial interface, but does not include a Bell-supplied audio response data set and software, the spokesman noted from 500 Stephenson Highway, Troy, Mich. 48084.

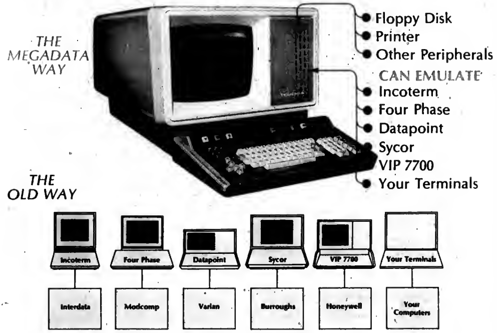
'Report' Examines 'Paperjams'

LOS ANGELES — A recent issue of Computer Sciences Corp.'s "CSC Report" looks at solutions to shipping documentation made possible by advances in computer and telecommunications technology.

The 20-page issue of the "Report," subtitled "Automation: Clearing the Paperjam," discusses the potential of a world trading community linked by a series of data networks providing unlimited exchange between trading partners.

The process is seen as a continuum that begins in the manufacturer's warehouse with automated goods inventory and order processing; continues through tracking and processing of land, sea and air cargo; leads through automated customs processing; and ends with goods in inventory at a destination warehouse, according to a spokesman.

Subscriptions to the publication are available at no charge, the company said from 9841 Airport Blvd., Los Angeles, Calif. 90045.



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Megadata Augments 700 Series With Specialized CRT

BOHEMIA, N.Y. — Another member of the 700 series of CRT terminals has been introduced by Megadata Computer and Communications Corp. — a specialized communications terminal for banks, airlines and message-switching systems.

Megadata's System 700/CT combines the programmed storage of forms and data entry control and verification with data transmission capabilities designed for message-switching systems, the company said.

Terminals in the 700/CT family have been designed to meet and anticipate the needs of large communications network users through the next decade, Megadata claimed.

They are factory programmed to be plug-to-plug compatible with all networks and require no changes to existing message switching computers, communications lines and software programs, according to a spokesman.

Data handling, text editing and communications capabilities are supported by a combination of message storage, transmission storage and program storage of 8K in the basic 700/CT, he said.

Total possible storage in the terminal ranges up to 64K bytes, he added.

The terminal has a 15-in. CRT capable of displaying up to 1,920 characters formatted in 7 by 8 or 7 by 9 dot matrices. Its typewriter-style keyboard includes a numeric pad, function keys and LED indicator lights, Megadata indicated.

Users can choose a maximum of eight transmission speeds up to 9,600 bit/sec and an additional "unique" speed of 19.2- or 38.4 kbit/sec, the spokesman noted. Communications are handled in Ascii or RS-232 serial asynchronous modes, he added.

The 700/CT is equipped with RS-232, RS-422 and current loop interfaces. It costs $3,950 in its basic form with 8K of storage, he said from the company at 35 Orville Drive, Bohemia, N.Y. 11716.

CA Aims Its First CRT Terminal At OEM and Large Mini Users

IRVINE, Calif. — Computer Automation, Inc. has begun its first in-house production of peripheral equipment with a CRT terminal intended for OEM and other large minicomputer users.

The terminal has a detachable keyboard, a 1,920-char. capacity screen and can be used as a control console for CA's Naked Mini-4 family of minicomputers or as a data entry and display terminal, according to the firm.

It is packaged in two modules consisting of a controller and CRT monitor, which displays 96 upper- and lower case characters and supports the full, 128-char. Ascii set, CA said.

An automatic scroll feature enables the page display to automatically move up one line when the screen is filled, the firm added.

The keyboard includes a 15-key numeric pad and 17 special function keys, in addition to an n-key rollover feature which is said to allow full-speed typing without locking the keyboard or dropping characters.

CA's peripherals entry reportedly uses a microprogrammed processor to perform the terminal control functions. A 4K-byte page memory stores data from the keyboard, CPU or both, CA said.

Communication with an interface controller or modem is made through asynchronous, RS-232 half- or full-duplex interface. Independently strappable transmission rates range from 75- to 9,600 bit/sec, the company added.

The terminal is equipped with a socket for the optional attachment of a bit-serial, asynchronous printer to obtain hard-copy data from the screen.

The CRT costs $1,900 and quantity discounts are available. A software and documentation package containing diagnostics and a user's manual costs an additional $50, CA said from 18651 Von Karman, Irvine, Calif. 92713.

Wats Changes to Affect Users

(Continued from Page 23)

- Some organizations which have been discouraged by the cost of inbound Wats for customer service will find that they can now afford it.
- Individuals who utilize company Wats lines at night from their homes or hotels will find this service less cost-effective.

The new rates place a premium on intelligent design and tight management control. Users who have not yet taken advantage of mini- or microcomputer-controlled Wats and leased-line access systems will want to take a fresh look, Poppel noted.

Concurrently, existing users of computer-controlled or computer-monitored Wats systems will be incurring unanticipated reprogramming costs.

And for the technically minded, the new restructuring will force users to change their mix of Wats lines, Poppel continued.

The configuration and controls will become more complicated with more of the Wats "bands" in use and the additional dimension of more leased lines and other special services, he said.

TDC Modular CRT Terminal Replaces Teletypewriters

ROCKVILLE, Md. — Terminal Data Corp. (TDC) has introduced its first CRT terminal — a high-speed teletypewriter replacement.

In its basic configuration, the modular Model 675 comes with a CRT monitor, teletypewriter-style keyboard, RS-232 or current loop interface and workstand, according to a TDC spokesman.

It features switch-selectable transmission capabilities from 110- to 9,600 bit/sec, selectable parity, half- or full-duplex operation, automatic line feed and page erase.

The CRT screen has a 1,024-char. capacity and the screen can be placed up to four feet from the keyboard.

The basic terminal costs $895. Other configurations come without a CRT or with an acoustic coupler.

TDC also has introduced the Model 1200, a one-line input, two-line output RS-232 data splitter, which allows one terminal to use two different modems without switching cables, according to a spokesman.

The Model 1200 can also provide a printer or plotter interface for a CRT terminal, the spokesman said, noting any speed terminal can be connected to the device, which is available in assembled or kit form.

The data splitter electrically isolates the two output devices from each other. It consists of a printed circuit board, RS-232 connectors, cable and a housing.

The assembled Model 1200 costs $89 and the kit costs $49, the spokesman said from 11878 Coakley Circle, Rockville, Md. 20852.

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DP Dialogue

Notes and observations from IBM
that may prove of interest to
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AP: Multiprocessing and Cost/Performance, too

More terminals in the online data network...

Enhanced applications demanding more resources...

Expanding business and a surging flow of transactions...

An accumulation of small increases like these may press the throughput capacity of the large data processing center. Or the pressure can come from a major new project.

Until recently, the center would install an additional uniprocessor. But now there is another growth option with major economies and operating benefits: the System/370 Attached Processor, Models 158AP and 168AP.

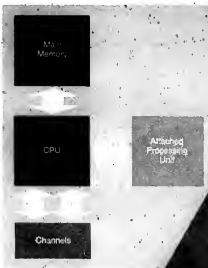
Firestone Tire and Rubber Company, INA Corporation and Merrill Lynch & Company are among those who have found that adding an Attached Processor can provide—at much less cost—nearly the throughput of two uniprocessors.

The Attached Processor is added to the main central processing unit, sharing its channels and memory. Both processors are controlled by one Multiple Virtual Storage (MVS) operating system which automatically balances the workload for highest productivity under user-selected priorities. Large multi-tasked jobs may be completed rapidly if both tightly coupled processors can be applied to them. There is no need to divide data files because both processors use the same main memory and system control program.

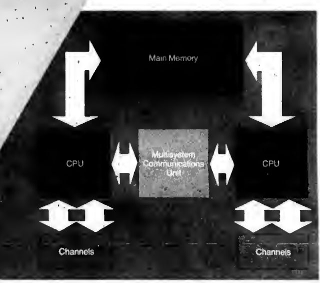
Thus the 158AP and 168AP provide further options in addition to the System/370 Multiprocessors, Models 158MP and 168MP. Multiprocessors are fully duplexed processors, each with main memory and channels. They can be reconfigured to continue operation if one processor is removed from service. Multiprocessors give high throughput and system availability.

However, the lower cost AP system offers about the same throughput as MP at a much better cost/performance ratio—where main memory, channels and availability of the uniprocessor are adequate.

The Attached Processor has been designed specifically to permit system growth without disruption. With its MVS operating system, it presents to each application the appearance of a single system, and functions as a single high-capacity processor for job entry, scheduling and control.



In the Attached Processor (AP), configuration of the System/370, the Attached Processing Unit shares the main memory of the CPU.



In the Multiprocessor (MP) configuration, two CPUs work in synchronism and share a combined main memory.

Online Processing Proves Thrifty for Schwitzer

IBM's DL/I online data base system supports manufacturing and marketing of turbochargers (seen here in final assembly) at Schwitzer.

"With an online data base system, our data processing costs are 15 percent lower than they would have been under batch. For one thing, we've eliminated data entry. Users now enter their own data at IBM 3277 Display Stations, and they take responsibility for its correctness. This eliminates a cost, improves data accuracy and enhances coordination among departments."

Henry W. Moore, Jr. is describing data processing at Schwitzer Engineered Components, Indianapolis, where he is manager of information systems. A division of Wallace Murray Corporation, the company is a leading manufacturer of turbochargers and other engine components for trucks, heavy off-road equipment and automobiles.

Schwitzer uses IBM's Data Language/1 (DL/1) to manage its online data base. "Under DL/1," Moore says, "we can respond much more quickly to users' needs—doing in minutes what would have taken days. Management doesn't always know in advance what information will be needed. We can respond fast to unexpected queries.

"For example, with the material and labor standards stored in our data base, we can quickly answer 'what if' questions about the impact on margins of changes in these cost elements."

At Schwitzer, applications such as production scheduling, material and inventory transactions, receiving and purchasing are online to the IBM System/370 Model 145. In all, some 900 programs access the common data base.

"Since information in a DL/1 data base is not redundant," Moore says, "cost-related items are the same whoever looks at them: accounting, purchasing or manufacturing. And we've gained a great deal of design flexibility in system development. We can add to a file or change the length of a field if an enhancement or new application requires it without affecting existing applications.

"To illustrate, before installing DL/1 we had to modify a purchasing file to accommodate an additional function. The enhancement cost us about $8,000 to develop. If we'd had DL/1, it would have cost $1,000.

"A programmer can build relationships between data elements 'on the fly' using simple procedures," Moore notes. "DL/I handles data storage and manipulation functions for him; he needn't be concerned with file structure at all."

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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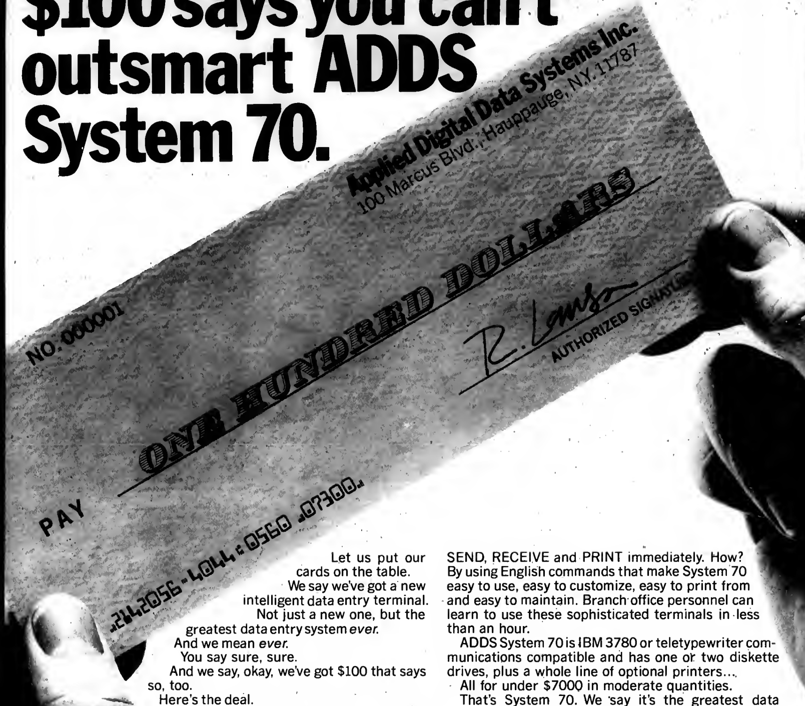

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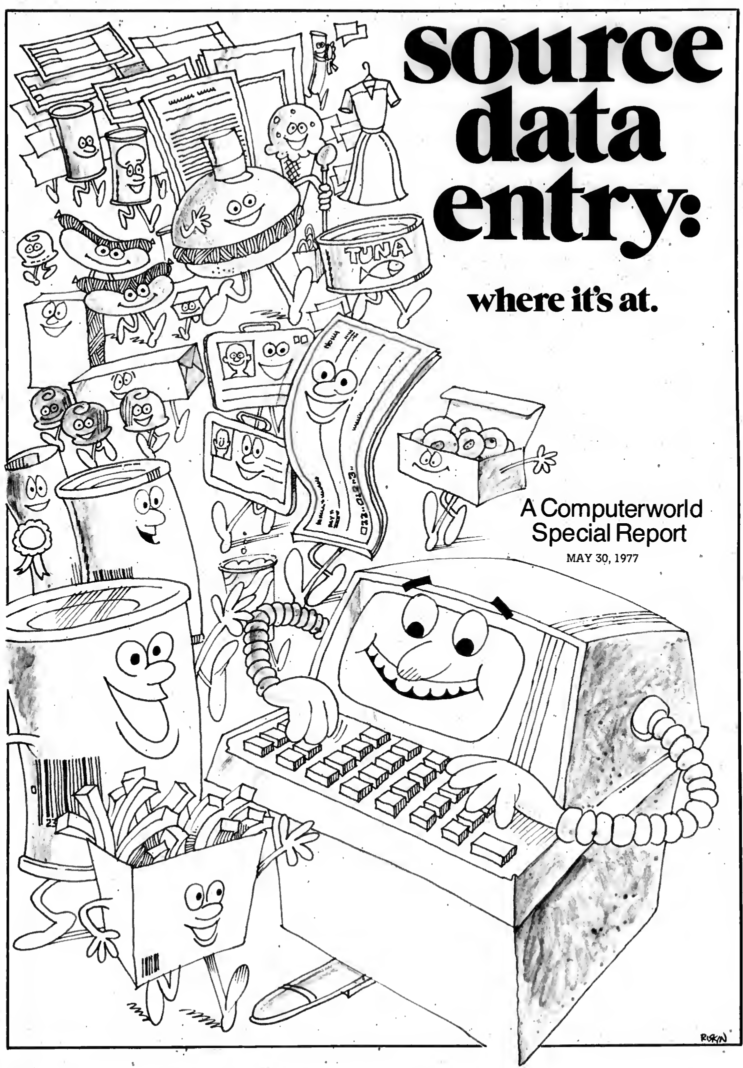

A Computerworld
Special Report

MAY 30, 1977

Improves Job Scheduling

Workstation Data Collection Aids Costing

RICHMOND, B.C. — A data collection system at a heavy metal works plant here allows management to pinpoint the status of any job, including labor and material costs, with near real-time efficiency and accuracy.

"The ability to pinpoint and control hidden costs is a key factor in determining the profitability of any manufacturing business," Helmut Eppich, president of Ebco Industries, Ltd., said. "We can detail labor costs on any job to charges-per-second if that is needed," he added.

Eppich's confidence comes from knowing exactly what every job is costing and whether adjustments have to be made in scheduling in order to meet delivery commitments.

"When we collected the data manually, we got this information seven to eight days after the fact and it wasn't nearly so detailed or accurate," Steen Bentzen, office manager for the plant, noted. "Now we get detailed information on the morning after the work is done."

Thirty-two data collection terminals are installed at workstations throughout the plant's facilities. They are used by employees before they start each job. Information on who is working where and on what is captured on a cassette from a control unit. The cassette is used to generate reports — on a Data General Eclipse 200 — which are corrected by plant foremen who account for variables.

The corrections are then entered into computer memory for generating precise job cost and production scheduling reports. The same data base is used to write the payroll and related reports and for inventory management.

The key to the variability of the system is the programmable 1647 data collection terminals and 1648 controller made by Epie Data Corp., according to Bentzen. "We used to have employees make entries on time cards every tiem they started and completed work on a job. Foremen had to check these cards, which were then delivered to the data processing center for keypunching. All of this took time, and the method was prone to human error, although we didn't realize how much until we started using the data collection terminals," he said.

"Furthermore," he added, "we were only collecting information in quarter-hour time increments. Since machine shop charges can range over $150 an hour, depending upon the equipment used, the cumulative impact was considerable."

With the terminal system, employees enter a plastic identification badge in a slot on the front end of the terminal. The terminal optically reads the badge identifying the employee. If he isn't cleared for that workstation an audible alarm sounds and an LED display indicates an error has been made. The employee can stop the alarm and reenter the card by pushing a "clear" button.

Ebco Industries employee enters informatin into a workstation data collection terminal.

If the card is accepted, the employee's number and time (which is displayed in hours, minutes and seconds on a display on the terminal) is recorded on the tape cassette at the controller unit. As an alternative, if the badge is unreadable for any reason, the employee number can be entered through the terminal keyboard.

Once the card is accepted, the display tells

(Continued on Page S/10)

Consumer Reaction to UPC Seen Skeptical

By Karen Stein
Special to Computerworld

By this time, practically every consumer is familiar with that small block of light and dark bars which appears on almost every item sold in supermarkets. And practically every consumer is still unconvinced that the Universal Product Code (UPC) will be used to benefit the consumer interest.

This is not to say that consumers are against the electronic checkout system. It is recognized that the system can, potentially, offer great advantages: speedier checkout service, improved inventory control, reduced checkout errors, an informational cash register tape and savings passed on because of reduced business costs.

However, it is felt by some that many of these potential benefits will not be realized. For example, the number of checkout lanes available may be reduced, inexperienced or untrained personnel may easily make computer programming errors, cash register tapes now in use vary greatly in the amount of information provided and some offer no more information than conventional tapes, and cost-savings may not be passed on to consumers in terms of lower prices, but instead may be passed to the stockholders or kept as profits.

Still, all these consumer concerns pale before the issue of item pricing.

Because the central computer decodes the UPC and sends back the price to the digital readout window at the checkout counter, retailers feel little need to mark an individual price on each item. As an alternative, some retailers have instituted shelf labeling.

Unacceptable Practice

Consumers generally find this practice unacceptable. The possibility of shelf drift — products not placed near the appropriate shelf price tag — is very real. Price comparisons among different forms of a food (i.e., frozen and canned) located in different parts of the store would be difficult. Some shoppers might find the tags difficult to read and understand.

A study by the General Accounting Office of 100 stores using shelf labeling found that 10% to 20% of the products were missing labels. Also, consumers fear that while the price of the item may be changed in the computer, the shelf label may not reflect that change.

Retailers have also suggested that consumers use grease pencils to mark the price on individual items they wish to purchase and that scanners be installed throughout the store to aid in price identification and comparison. Again, consumers are likely to object to these panaceas. Their goal, and one of the system's goals, is to make their purchases as quickly and efficiently as possible and not to engage in activities that would increase their shopping time.

But the main reason for rejection of shelf labels is that visible item pricing is a consumer right. The right to information, as stated by John F. Kennedy in 1962, is basic and nonnegotiable, and price is the most important component of information. Testimony offered to the House Subcommittee on Consumer Protection and Finance by the Consumer Federation of America reiterates why item pricing is vital to consumers:

- Visible pricing contributes to price consciousnous and awareness which has a dampening effect on inflation.
- It is an important instrument of comparison shopping.
- It provides a defense against instantaneous price changes.
- There is no insurance that the shelf tag will be accurate or that it will correspond to the intended product.
- It is a tool to verify the accuracy of the prices you pay.
- It is easily used by consumers and provides them with readily available information during the shopping trip, at the checkout counter and when they are home budgeting and meal planning.

Industry has raised some specific objections to item pricing and consumers need to address themselves to those issues too. The point has been raised that some items, such as fruits, have never been item priced and that it would be most difficult to item price fast turnover items such as milk and eggs.

Consumers would be willing to accept certain exemptions which seem reasonable. The goal is not to impose excessive demands but to ensure the continuance of information which, in the past, consumers have had and do need to maximize

(Continued on Page S/12)

Terminal Concurrency Capability Offers Many Processing Options

By Al Moulton
Special to Computerworld

The systems configuration which assures the most effective execution of source data entry is one which includes the ability to perform both individual transactions and a variety of local processing tasks.

This capability — called terminal concurrency or multifunction terminal usage — provides a user with a variety of options, nearly all of which are directly related to the effectiveness of entering and handling data at the source.

Hardware and software function packages are obtainable today which allow some terminals to interact with a host computer on a transaction basis, while other terminals within that configuration perform other vital source data entry related tasks such as data validation, extended editing, file creation and maintenance, remote job entry and various levels of local batch processing.

Implicit in the concept of distributed information processing is the capability to perform at least two or more of these functions on a single system at the same time. Ideally, such a system should be able to perform, through individual terminals within a single system cluster, nearly all of these functions at the same time — with very little performance degradation.

Such a system offers a wide range of additional specific user benefits well beyond just powerful source data entry processing. These additional benefits include:

- Common equipment sharing — The ability of multiple users to have access to any terminal or workstation in the cluster to perform any of the functions then needed.
- Single-vendor support — Having a true multifunction terminal system, complete with all required peripherals, allows a

(Continued on Page S/10)

On the Inside

Workstation Data Collection Aids Costing S/2
Consumer Reaction to UPC Seen Skeptical S/2
Terminal Concurrency Capability Offers Many Processing Options S/2
Distributed DP Key Factor in Source Data Entry Choice S/3
Ideal Entry Said to Come Straight From Source's Mouth S/4
OCR Satisfies Chrysler's Search for Efficient Input S/7
Pre-Editing Makes Fanny Farmer Sweet on Key-to-Disk S/8
Numerous Entry Approaches Lead to Multimedia System S/9
Two-Year-Old POS 'Test Bed' Continues to Hum Along S/11
Mini-Based System Digests 'Whopper' Consumption S/14
Custom Forms Reduce Service Bureau's Keying, Costs S/15
Tight Cash Management Helps California Earn $200 Million Annually S/15
'Money One' Verifies Checks for Banks, Retail Stores S/16
Standard Source Marking Code Gaining Acceptance S/17
Intelligent Terminals Speed Box Maker's Cost Estimates S/18
Voice Response System Facilitates Cash Consolidation S/19
Operator Performance Can Be Judged Without Standard S/20
Winning Over Employees First Step in Installing FDC S/21

Distributed DP Key Factor in Source Data Entry Choice

By George H. Johnson III
Special to Computerworld

The potential benefits of distributed computing are prompting nearly all users to consider decentralizing their DP operations. Four of the most significant benefits are: more timely data; more valid data; and, as a result of both, improved management decision-making capabilities and better responsiveness to customers.

Users are approaching distributed processing with great caution, despite a hardware pricing trend which continues downward and despite the availability of powerful, easy-to-use software.

Many users are opting for source data entry as an interim measure. Their reasoning: as much as 80% of the total computing workload at remote locations will involve data entry.

A number of vendors today offer systems which make source data entry a viable first step into distributed computing. In choosing from among those vendors, users should keep in mind the three factors contributing most to smooth decentralization:

- Compatible systems — If source data entry will not be the last step into distributed processing, users must look for vendors offering both data entry and remote processing capabilities. Each system or family of systems must be compatible with the others to provide for future growth on a step-by-step basis.
- Nationwide service and support — Few users can predict their distributed computing requirements far into the future. It is important, therefore, to select a vendor able to service hardware and software no matter how remote the location.
- Product potency — When considering the future potential of a distributed processing system, it is sometimes easy to overlook today's requirements. Users considering source data entry as an interim step into distributed processing should weigh carefully the data entry and data communications features, functions and benefits a vendor can provide now for a remote location.

Basic Requirements

As a minimum, source data entry systems must fulfill four requirements. They must be easy to set up. They must be easy for operators to use. Like centralized configurations, source data entry systems must provide "clean" data to a host mainframe, and remote systems must provide that data on a timely basis if they are to be effective.

Product features which make a remote system easy to set up include the ability to define fields, multilevel programming and level-to-level duplication. Features which make a source data entry system easy to use include a high visibility screen, full keyboard cursor control and simple character and record insertion or deletion.

Such features as range checks, table lookup, tape validation, easy error reset, audit logs and batch balancing represent the minimum acceptable level for ensuring valid data. Timely data requires, at minimum, such features as background data transfer and concurrent data entry and remote batch communication via a choice of industry-standard protocols.

Users who must take future demands into account cannot and should not be content with those minimum performance levels. A variety of new product enhancements, spurred by competition among vendors of source data entry systems, offers users more function-per-dollar than ever before. The enhancements span the range of requirements a remote system must fulfill — from data entry through data validation to data communications — and represent new standards users should consider in selecting equipment.

Perhaps most significant among the recent wave of enhancements to source data entry systems is the addition of remote job entry (RJE) capabilities. RJE provides an extra measure of applications flexibility and an extra measure of user control over jobs transmitted from a remote site.

An RJE capability allows source data entry systems to address such IBM spooling programs as JES/RES, Hasp and Power, permitting remote sites to determine the status of jobs in queue and to change job priorities, if necessary. Non-IBM spooling programs such as GRTS or Grasp should also be supported.

Such a capability would be incomplete, however, without three prime support features. They include the ability to create, store and recall both message formats and transmission parameters, as well as the ability to store on disk the JCL cards needed for inquiries or priority changes.

In addition to those three prime features, users should specify the enhancements which will maximize the efficiency of remote batch communications.

Such enhancements might include the ability to queue job control statements, permitting unattended operation at remote sites; the ability to emulate a mainframe in order to send print data from source data entry systems to other remote batch terminals; the ability to monitor batch communications jobs in progress from a supervisor's display screen; double buffering, which can significantly increase the speed of output peripherals by overlapping I/O and communications tasks; the ability to spool data which has been directed to a printer; and provision for a message file on disk.

Enhanced Data Integrity

Operator-oriented "human engineering" features in remote data entry systems, together with data editing aids, work to ensure that only valid data is transmitted to a mainframe.

Among the operator features users should expect as standard are the ability to delete as well as to insert characters with a single keystroke; the ability to return to any location on disk with a single keystroke after paging backward through multiple records; the ability to return to the first keyable position within a record from elsewhere within that record with a single key command, and the ability to repeat keystrokes as well as functions with a single key depression.

The type of data entry aids users can specify include provisions for building collated index sequential files for table lookup and validation purposes. Some systems currently on the market still handle table lookups in serial fashion, with searches beginning at the top of the table and continuing until a match is found.

System software, in addition, should permit the chaining of tables and the mixing of both tables and ranges, allowing users to specify more than one function per field.

Johnson is a product support manager for Inforex, Inc., Burlington, Mass.

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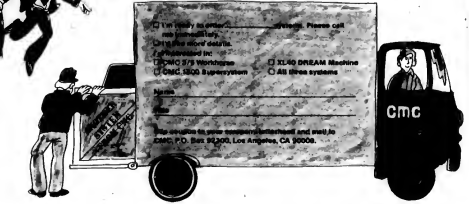

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Human Voice Wins Hands Down

Ideal Entry Said to Come Straight From Source's Mouth

By Arnold J. Popky
Special to Computerworld

Source data entry isn't a difficult concept to define. At least not in theory. It should simply be that data which is entered into a computer by a person actually doing a job — the source of the data.

But in practice there is very little data entry that qualifies as true source data entry. All too often, the person actually doing a job isn't entering the data. He's merely collecting it.

In those rare instances when the person is entering it, the process of entering the data adds more steps to the job being done. And nobody needs more steps in any job in a production environment.

Which means that right now there is only one ideal form of true source data entry and that is voice data entry. This is true simply because using the human voice rather than the hands to enter and verify data leaves the hands free to do the primary job.

This is a crucial difference when the job in question is being done on a loading dock, a factory floor, a test bench, a packing area, a warehouse or a distribution center. In most current work situations, information is being captured by individuals doing a job when they write it down, mark a card, rip off a tab, circle or underline specifics or type data on a keyboard. This information is then passed along to other departments where it is actually entered into the computer. Other operators assemble the information and keypunch it, punch it to tape, pass it through an optical reader or load it in a card reader in order to put it all in the batch system.

Often these intermediate steps can add quite a bit of turnaround time to the data entry cycle, which means current information isn't really current. And we all know how many errors can slip through undetected, which requires more time, money and effort to correct later. When you need information quickly, for making management decisions, you have to know that it's the latest available and that it's correct.

Mobility Possibility

With voice data entry, each worker uses a standard headset and microphone. These can be standard plug-in types connected by wire to a workstation. Or they can be wireless, using belt-clip transmitters to provide worker mobility up to 500 feet from the voice data entry device.

The device to which the headset is connected consists of a microprocessor-based speech recognition processor, a local operator's console and an alphanumeric display or CRT screen. This peripheral gear is connected to the computer system via standard RS-232C or 20mA current loop interfacing. It actually looks like a terminal keyboard to the computer.

As each worker does his job — testing, monitoring, sorting, packing, picking or whatever — the data to be collected is simply spoken into the microphone. A digital display or CRT screen located near the work area provides immediate feedback of the data entry for verification, and a short spoken command enters it into the computer.

The master data base is thus updated immediately in a real-time, interactive mode. Management has instant access to the latest information. And all the while the worker keeps working.

Let's take a look at some specific application benefits. In a receiving environment, goods can be routed for distribution within the company much faster and inventory files can be updated instantaneously for faster filling of orders.

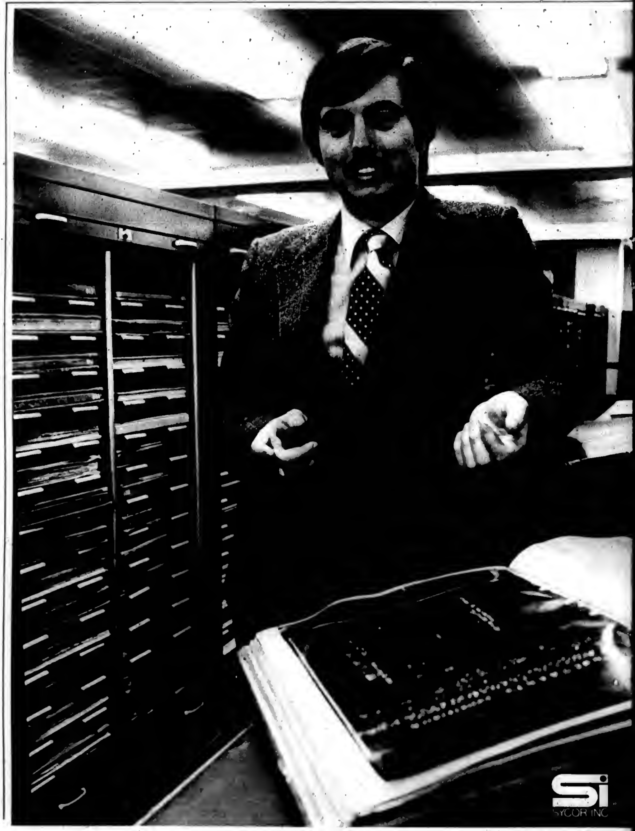
In a shipping environment, as each box of goods is packed, an invoice can be cut on the spot. As trucks are loaded, a waybill and other shipping documents can be cut with the exact contents listed.

Patterns Perceived

In a production environment, quality control testing or inspection can be controlled more easily. Each inspector can be led through a series of inspection steps and any parts deviations or errors can be reported directly back to the computer. If a pattern develops, the system will realize it more quickly and changes in production flow can be made accordingly. Catching flaws at this early stage saves money both in production and in warranty areas.

In a distribution environment, packages or goods coming into a central or regional facility for split distribution to other areas can be sorted more economically. People can unload trucks and simply call out the destination of each package. It's entered in the computer and that package is automatically routed to the proper truck for delivery in a local area or to the right airplane or freight car, for shipment to another part of the coun-

(Continued on Page S/18)



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Increased Document Throughput

OCR Satisfies Chrysler's Search for Efficient Input

DETROIT — Chrysler Corp., with over 1 million warranty claims to process annually, has been involved in a long search for the most efficient ways to handle this data.

In the early 1960s, IBM 029 keypunches allowed each operator to process 25 to 30 claims an hour. In the late '60s and early '70s, key-to-disk entry technology upped the operator output to 40 to 45 documents each hour.

Not satisfied that 40 to 45 documents an hour was adequate, Chrysler examined optical character recognition (OCR) to process its warranty repair order workload. As a result of this examination, and the resulting use of IBM Image Systems technology, the document throughput has been increased to over 85 documents an hour for each operator.

The system consists of an IBM 1288 scanner, an RPQ video collect and a network of 3277 display units. The 3277s were also an RPQ version to display video images.

The key to the OCR system's speed is the technology which allows selected data fields to be collected as video images during the scanning process. Images can be taken of any single specific character to a group of characters from 1/4 in. square to a 1 in. by 3 in. area, according to Jim Payne, manager of the auto sales group systems and data processing department.

Until the IBM 1288 scanner with image technology came along, Payne continued, optical scanning was not feasible in regard to this particular application because of the high volume of errors due to the handwriting required, the difficulty in devising methods to correct the errors and the relatively high volume of handwritten alpha characters being processed on basically what was a numeric machine.

The operators on the 3277 network now correct all errors encountered during scanning. They also enter data and verify all fields that are video collected during the scan operation. Thus, the system flashes video images to the operators' 3277s, and the operators respond by keying the correct data back into the system. At no time does an operator handle the original claim document, he added.

A response time of .3 seconds or less is required to allow a skilled data entry operator to maintain production rhythm. Responses in the .3 second range are only possible through a local 3277 network, he said.

Without image systems, the equipment could not accept a wide variety of handwriting styles from over 17,000 people in the 5,000 U.S. Chrysler dealerships, Payne said.

Document rejects have been reduced to an average of only five out of every 10,000 documents scanned. These rejects are due mainly to the mutilation of the documents' reference mark, he noted. If the form's document reference mark is intact, the form can be processed through the scanner.

Form Development

Another prime area of concern in OCR's early days was the design of the scannable document which the dealerships would be required to fill out. Requirements for the form had to take into account the people who would be using them, such as mechanics, service managers, accounting personnel and parts personnel.

After 18 months of design and testing, the forms were put into national dealer use.

The OCR system is designed in four parts: scanning; on-line validation, whch consists of error correct data entry and verification; extraction and purging of data from active files, and statistical reporting.

Many technical problems occurred in setting up the OCR system, Payne indicated. Some of these were:

- Poor response times because of the job mix in the mainframe.
- Interferences by the paging supervisor when large batch jobs were being run.
- Software problems — The IBM 1288 recovery routines did not recognize the video RPQ.
- Microfilm numbering problems — The microfilm number, which is important in locating data, was never designed to be used in an OCR system.

The main hardware components used in the OCR system are: an IBM 370/168 as the prime CPU and a 370/158 as backup computer with 3330 single- and dual-density disks, 1288 scanner with video RPQ, 3277 display with the video display RPQ, Kodak microfilmer and Kodak microstar.

The software employed in the OCR system is OS/VS2; Tcam local network; BDAM; Disam, a Chrysler developed access method; and QSAM.

"With Sycor 440 terminals, we increased productivity 43%."

Jim Millington, Project Manager
Chicago Title Insurance Company

Chicago Title Insurance Company, with more than 160 offices and 1600 agents, provides title insurance on real estate nationwide. This kind of insurance increases speed and efficiency in completing real estate transactions and protects against loss due to title defects. Chicago Title issues over 600,000 of these policies per year.

"Historically, title records have been kept by hand," Project Manager Jim Millington says, "but the volume of title actions in many densely populated areas demands speed and accuracy that hand-search simply can't deliver. That's why we developed OPTICOM—a computerized system for indexing the name and land records essential for providing title services—and made it available to our branch offices and agents.

The Sycor 440 tackles the heavy-volume areas.

"OPTICOM—which includes the Sycor 440—is the most cost-efficient way we've found for handling heavy volumes of title actions," Millington explains.

"Information about a specific piece of property or about individuals is stored on the 440's 10mb disk. The data is entered on terminal display stations with eight special formats which cover each type of action concerning a piece of real property. The terminal controls formats and guides the operator, so data errors are almost completely eliminated.

The Sycor 440 makes instant name searches.

"In addition to collecting, editing, verifying and sorting all our data," Millington notes, "the Sycor 440 also lets the Chicago Title branch or agent make name and property searches against up to 30,000 current records. Instantly.

"But the real payoff is that our users get more work done faster. Our studies show that they've been able to increase productivity 43%. And the Sycor 440 requires less-experienced people to achieve this productivity level.

Sycor 440 reduces operating costs.

"Our increase in productivity and Sycor's attractive lease structure help us hold down operating costs," Millington reports. "And in addition to the daily capture of OPTICOM tasks, we also maintain our accounts receivable and customer name and address files by using data entry programs on the Sycor 440.

"The records created by OPTICOM and these data entry programs are transmitted daily to Chicago Title's CPU for processing. Reports generated and updates to the OPTICOM file are transmitted back to the local 440s overnight. We feel that this approach to distributed processing is the most economical way to provide our users with timely information. I'm really pleased with the 440's performance."

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Order Processing More Efficient

Pre-Editing Makes Fanny Farmer Sweet on Key-to-Disk

Special to Computerworld

BEDFORD, Mass. — Fanny Farmer Candy Shops, Inc. discovered that using inefficient DP to distribute 16 million pounds of chocolates to over 3,000 customers could be quite a bellyache.

In mid-1976, Fanny Farmer was committed to improving and streamlining its entire DP system to provide faster turnaround of customer orders and improved service, Donald W.Thoreson, DP manager, said.

Before deciding on any particular method or brand of data entry equipment, Fanny Farmer studied the existing system. The firm determined that the in-place Honeywell 115, which had four tape drives and two disks, was being utilized as much as three hours per day just editing input, he pointed out. Consequently, the decision was made to develop an off-line data preparation system that could edit input, feeding virtually clean data to the mainframe.

During the data entry evaluation period, Fanny Farmer also installed a new mainframe. Its Honeywell 2040A features four tape drives and three disks, and with 98K bytes of core it is some three to four times more powerful than the earlier mainframe, Thoreson said.

Fanny Farmer thoroughly evaluated the major key-to-disk data entry systems on the market. Editing at the point of order entry was vital. At the same time, since Fanny Farmer wanted to utilize already-trained keypunch personnel, a great deal of automatic functions had to be built into the system for maximum efficiency. When the selection process was finally complete, Consolidated Computer's Key-Edit system was selected.

Installed and operating since September 1976, the Key-Edit system has reduced the mainframe data editing to an insignificant amount, Thoreson said. At the same time, order turnaround time has been cut from a maximum of two days to same-day processing. Finally, the cut-off time for order receipt at the computer center has been increased by three hours daily so that more orders are processed than before, he added.

> *'Fanny Farmer thoroughly evaluated the major key-to-disk data entry systems on the market. Editing at the point of order entry was vital.'*

"Orders are received at the data center by phone, mail and an automatic telephone answering system, enabling us to receive orders 24 hours a day. It is difficult to be specific about the average number of line items per order, but during peak holiday periods, as many as 70 different items per order is not uncommon," Thoreson said.

"Since quick but accurate turnaround is necessary," he continued, "we have strict cut-off times. Before the Key-Edit system was installed, we would not process any orders arriving after 2 p.m. until the following morning. Now we have extended that deadline until 5 p.m. In other words, if an order reaches the data center near the end of the business day, it will be processed — and more than likely shipped the very next day," he said.

"The Key-Edit system, which enables us to give the central CPU preedited data by 6 p.m., assists our in-house designed Central Order Processing System (Cops) to be more efficient. Because the data entry system edits so much, we have been able to extend the deadlines and consequently provide a higher level of customer service," he added.

Cops resulted from the system's ability to do multiple editing, Thoreson explained. "We found that Key-Edit can do several editing tasks automatically and simultaneously, so we can get more work done with the same number of people and have 'cleaned up' the data to a significant degree. The flexibility of the hardware was certainly responsible for our success, especially multiple editing," he stated.

Little Retraining

Judy Corum, data entry supervisor, added that "we did not have to make any personnel changes when we went onto the Key-Edit system. Our keypunch operators were eager to get the new equipment, and there was very little retraining.

"Because of the editing capability, the operators have to look for very little as they enter orders," she explained. "For example, the header record automatically takes the operator through just those fields necessary for the type of order being keyed. If the order is for a retail customer, only those fields required are called up, the operator fills-in-the-blanks and doesn't worry about it again. Should a mistake be made — such as posting to the wrong type of account — the system automatically 'locks out' the operator until the mistake is corrected, validated and released back into the system," she noted.

"The automatic features of the system have allowed us to really boost the number of records we process. An average day will see us process more than 4,000 records; during busy times we can go well over 7,000. Check digit, table look-up and the disk all combine to make the operator's job easy. In fact, we average between 10,000 and 12,000 keystrokes per hour and have hit 17,000 strokes," Corum noted.

She also pointed out that "the operators have gained a new sense of job satisfaction because once they key in an order, it's extremely unlikely that they will get it back. The combination of a quiet, good-looking terminal and the knowledge that they won't be rekeying the same orders over and over again has led to a greater degree of job satisfaction."

In addition, Thoreson said, "because we can now do more inputting during normal working hours, we have all but eliminated overtime. Our busy period coincides with the holidays, when most people want to spend time with their families; so we feel we have solved a personnel problem, too."

Thoreson also praised the cooperation they received from Consolidated Computer." "Both the reliability of the system and the people themselves are outstanding; they have been understanding of Fanny Farmer's problems rather than looking at any problems from the system point of view," he concluded.

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Numerous Entry Approaches Lead to Multimedia System

By **Lawrence Feldelman**
Special to Computerworld

Computer data entry has come a long way in the last 13 years. Starting as a centralized keypunching operation, it has gone through numerous changes in terms of equipment, medium and methodology. In today's computer world, the modus operandi is "source data entry" — capturing computer-bound data at its point of origin — the exact opposite of the original centralization concept.

This complete about-face is not surprising when one considers the fact that a data entry system can be more complex than the computer system it supports, not so much in terms of software as in terms of system design. A data entry system is a combination of hardware, software and "peopleware." The people who operate the data entry machinery represent a much more critical part of the data entry system than their counterparts do in a computer system.

In a successful data entry system, all three elements — hardware, software and peopleware — must complement one another and operate in perfect synchronization. Changes in any one of these elements will inevitably impact the other two.

In a very real sense, today's movement toward distributed data processing has brought to light the important role of data entry in an information processing system and reinforced the idea of source data entry. But the movement toward source data entry has been going on for some time.

Seed is Sown

Up until 1964, keypunching and data entry were synonymous. Then came the key-to-tape unit which offered the user a fast method of entering data by bypassing the punched card. What followed has been a seemingly unlimited variety of data entry systems designed to replace keypunching in the centralized site and, more importantly, to collect data at the remote location. Interestingly, while there have been numerous different approaches, they are all converging at the same point.

As we know, the key-to-tape unit started as a stand-alone device, but soon evolved into the multiple-terminal key-to-disk system. The key-to-disk system started out as a means of replacing the keypunch. However, with technical innovations in the mini and microcomputer areas, together with maturity of data entry software, the key-to-disk system permitted the data entry sphere of influence to extend beyond simple data conversion. Key-to-disk software permits validation of original source data as well as operator entry checks, data reformatting, separate data files for storage of constant data, validation tables and information retrieval and execution of application programs.

With all this inherent data entry and processing power in this rather small minicomputer system, it did not take long for users to realize the advantage of placing terminals in user departments where the original data was generated. While the system software enabled validation of the data, errors could effectively be corrected within the departments. Under this condition, it is only natural that operators take a personal interest in the accuracy of the data more so than in the centralized system.

Extending this concept to data entry at remote locations has been possible by use of remote on-line terminals and key-to-disk systems with data communications capability.

Today, with the implementation of business-oriented programming languages such as Cobol, RPG-II, Extended Basic and various versions, the user is given the opportunity to not only enter data but also preprocess it at the source.

Cassettes Lower Costs

During the introduction of the key-to-tape system, the compact magnetic tape cassette also made its appearance as an alternative to the much bulkier computer-compatible magnetic tape. Unlike the centralized key-to-computer-compatible tape theme, the key-to-cassette was designed to provide low-cost data collection at the source and to transmit data in batches to a central computer. The terminals were composed of typewriters or CRT keyboard displays and a hardwired controller that provided a means to place data into the tape cassette.

> *'In a very real sense, today's movement toward distributed processing has brought to light the important role of data entry in an information processing system and reinforced the idea of source data entry. But the movement toward source data entry has been going on for some time.'*

With the microcomputer technology, the intelligent terminal came into being. Providing programs to edit and check data at the source, it assured the remote user of the accuracy of entered data. Since then, the intelligent terminal has been expanded to accommodate diskettes and magnetic disk cartridges in lieu of magnetic tape cassettes. Multiple terminals per system, sophisticated data entry software and user programming languages are also available.

While the previously described keyboard entry systems relate to the office environment, the value of placing specialized data entry terminals at the work area has been proven with the point-of-sale terminals for calculating and capturing retail store sales, factory data collection terminals for capturing production data on the shop floor, library circulation terminals for capturing data on book borrowing, financial terminals and so on. Each of these has evolved into a system with specialized data terminals, minicomputer controller, disk storage, programs for capturing and processing data and usually data communications for transmitting resultant data to a central site.

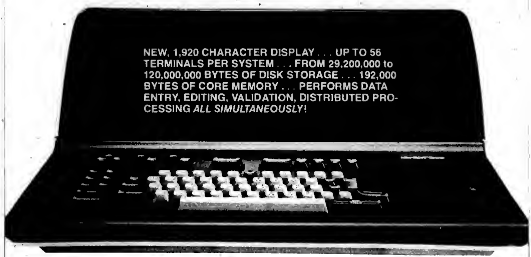
Optical Accessories

The optical reader, once regarded as a revolutionary approach to data entry, has had its ups and downs for many years as it attempted to directly replace keyboard entry. Initially, optical readers were large, high-volume character readers designed to read printed and typewritten data. The one fly in the ointment has been a problem of character rejects and errors due to poor print and paper quality. Also, the need to transport documents to the center still exists.

Today the optical reader tends to serve as part of a multimedia data entry system rather than attempting to do the whole job.

(Continued on Page S/12)

ALL THIS POWER



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Terminal Concurrency Broadens Processing Options

(Continued from Page S/2)

user to consolidate functions around a single equipment configuration with a single source of responsibility for systems, equipment and maintenance support.

- Streamlined training — By eliminating a multiplicity of different devices performing different jobs, truly concurrent systems greatly simplify the training, upgrading of skills and cross-training problems so often encountered in remote site locations.
- Common languages — To perform in a multifunction mode suggests the equipment has a powerful interpretive language that is both singular and expandable. Thus, programming investments and software maintenance are minimized.
- On-line backup — Concurrent systems have, in effect, their own "fail-safe" capabilities built in. If line problems occur, on-line transactions can be stored locally for later transmission. If terminal controller or peripheral problems occur, very often data can be sent on-line to the host for backup.

Concurrent Capabilities

The costs of remote site hardware can be significantly reduced in most distributed processing applications by installing systems with concurrent capabilities. This allows single product configurations to do the work of several different kinds of devices most usually associated with source data entry and remote intelligence — standalone or clustered data entry terminals, interactive terminals, remote job entry terminals and remote batch terminals.

This multifunction capability allows terminals to function as "intelligent" devices. Using a high-level language, users can program whatever custom operator prompts or parameterized data validation routines they desire in order to perform user editing of the data prior to transmission to a host processor.

Multifunction devices also permit local processing, since all terminals can access local disk files, printers and other system resources. Concurrency extends that capability by allowing transactions initiated from those same terminals to branch to the host if access to files stored at the host is necessary. That branching occurs under control of user application programs. No additional equipment or operator retraining is necessary.

Most of the transactions initiated at remote sites within distributed computing applications can be processed against files located at those sites. As a result, a costly overhead burden is removed from the central site. Nearly all applications, however, also require some access to centrally stored files from remote locations. Until now, specific devices have been dedicated to those transactions.

Concurrent multifunction devices can now provide access to central files on a transaction basis from the same terminals the remote site uses for data entry, local file maintenance, remote job entry or local processing. The host and the communications lines between the remote site and the host are used on an exception basis.

The addition of a multifunction capability is attractive to two types of customers — users who want an upgrade path and additional capabilities and users who currently employ separate devices to handle data entry, remote batch, local processing and online requirements.

Other important features which must be carefully weighed include the ability to drive line printers, the ability to access disks which can store programmed screen formats as well as files, and the ability to edit transactions at the time of entry — all under the control of user application programs.

Separate communications facilities can be obtained today — batch and interactive — which can be accessed from the same terminal. The concurrent multifunction capability, together with these other features, gives branch offices or departments of large computer-using organizations the multifunction capabilities they need. Those capabilities, in turn, allow users to balance their computing requirements effectively between remote sites and a central location.

Moulton is the manager for PTS programming at the Raytheon Data Systems Co., Norwood, Mass.

Work Site Collection Improves Job Costing

(Continued from Page S/2)

the employee to enter a prepunched 80-column job card into another slot, and it is fed through the terminal. These cards are stored in racks located next to the terminals. Even crumpled cards can be read. The same procedure as described above is repeated.

Once the information on the job card is entered, the employee can enter the prenumbered items and quantities of materials needed for the job through 20 keys on the terminal. To complete the information transaction, the employee just pushes the "in" key.

When an employee is ready to sign off of a job, he only has to reenter the badge and press the "out" key. With this information written on the tape, computer reports can pinpoint material and labor costs for any job to the minute, Bentzen noted.

Bentzen estimated that as many as one in 10 time cards previously had some kind of error caused by people misreading handwriting, transpositions of numbers and so on. He also estimated that the dollar loss in billing might have been as much as 1% of the overall volume, or around $80,000 a year. "On this basis alone, we recovered the cost of the terminals within four to five months of installation," he added.

In addition to reducing costs, Bentzen pointed out this frees the keypunch equipment and personnel for other data preparation. "Payroll, of course, always has first priority, so other data entry often had to be delayed while the data processing service we use was keying data from our time cards. Now all data entry can be timely and accurate," he added.

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Two-Year-Old POS 'Test Bed' Continues to Hum Along

By Mal Stiefel
Special to Computerworld

BRIGHTON, Mass. — An 8-terminal Universal Product Code (UPC) scanner system, installed by NCR Corp. in First National Stores' subsidiary, the Big Buy Supermarket, has been humming along as a "test bed" for two years. The company still hopes Massachusetts consumer laws will change some day, allowing items to be placed on the shelves without individually marked prices, to make a scanner-based point-of-sale (POS) system cost-effective in widespread application.

The real-time system, centered around a dual NCR 726 processor configuration, tracks sales at all cash registers and issues management reports.

With POS, the store management has realized better control of the payment media — cash, food stamps and coupons — at each checker station. Errors have been reduced and the process of closing the books at the end of the day has been made easier.

On the other hand, learning how to condense and absorb the mass of available information has been "a barrier" that's gradually being overcome, according to company spokesman Paul Kleihauer.

Management is still trying to find out how to extract and correlate data in the most meaningful ways, he went on. There won't be any point in expanding to other stores unless an effective data reduction system can be devised.

Customers are satisfied with the system, although sales volume hasn't been affected.

Quantum Jump

The installation, begun in 1973 as an electronic cash register operation controlled by one processor, took a quantum jump in sophistication with the arrival of the scanners, along with the second processor and secondary storage, in March 1975.

The so-called primary processor in the current setup controls the front-end checker stations, accepting inputs from the scanner. A 900K-byte head-per-track drum stores programs and files used by the scanner programs.

Once a second, total sales data is fed over a cable to the secondary processor, which can take over the front-end function if the primary processor or the drum goes down.

The secondary processor has two 5M-byte disk drives — one with a fixed pack, the other removable. Like the primary processor, the secondary CPU is an NCR 605 mini with 32K 16-bit words of main memory.

The secondary processor also has a 2,400 bit/sec phone link, for communication with First National's headquarters in Somerville, Mass., Kleihauer said.

The secondary unit handles the maintenance of the UPC disk file, containing UPC code, department number (dairy, frozen food, general merchandise, etc.), price and description for each of 10,000 items. An additional 2,000 to 3,000 items in the store's inventory that haven't yet been given UPC labels aren't kept on the file.

All Transactions Recorded

Headquarters sends file updates (item adds, deletes and changes) to the store each Friday, to be held in a suspense file until Monday, when the secondary (disk) and primary (drum) UPC files are actually updated. An audit trail report showing all transactions is printed on the 132-column 175 char./sec dot matrix printer tied to the secondary processor.

The printer is also the output medium for short (typically one to five pages long) management reports, showing current day or current week sales activity on selected groups of items, such as all items in a given range of UPC codes or all items in a given department.

The printer also comes into play at the end of each day; when the day's sales statistics and expected media distributions are produced. The manager can also enter the actual media counts at each checker station; the system computes and prints the differences.

When the scanners were first installed, only about 1,200 items were placed in the UPC file, Kleihauer explained. At that time, only a few manufacturers had begun printing the 12-digit UPC label on their products.

Since then, the number of items on file has steadily increased to its present level.

Kleihauer pointed out that many manufacturers have assigned codes to their products but haven't yet begun printing labels. Others have printed labels, but are first using up their old uncoded labels. Thus, the rate of conversion varies from manufacturer to manufacturer and from commodity group to commodity group. On the whole "the manufacturers have done a superb job" of switching to UPC, Kleihauer said.

He anticipates that virtually all items will be UPC-coded in the next few years.

There are UPC label printing systems, tied to the weighting equipment in the produce and meat departments, for labeling prepackaged (i.e., packaged in-house) items. These units have been somewhat unsatisfactory; the labels tend to smear, rendering them unscannable, although the NCR 255 scanners themselves have been reliable, Kleihauer noted.

15 Cents Off

On occasion, an item on file will have two different manufacturer-assigned UPC codes. This can happen if a manufacturer sets up a promotional sale for, say, 15 cents off on a can of beans. Then a second UPC code will be assigned to the sale cans, distinct from the code on the fully priced items. Before the sale items are delivered to the store, the second UPC code will be put on file with the lower price.

Up to this point, the store hasn't attempted to control inventory through the system. Full inventory control won't be feasible until the entire stock is UPC-coded. However, it may be attempted first on a small scale for selected groups that are completely encoded.

When the time comes, the store won't have to worry about adding the inventory control software. Since NCR uses this store as a primary software pilot site, all of the programs are already on hand.

How to jump into key-to-disk, without giving up your

Granted, key-to-disk equipment does good things for data preparation in high-volume applications.

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This is one big jump that is best accompanied by a little foot-dragging. Because, in your enthusiasm for the things key-to-disk can do, you may forget what it can't do: read and punch cards.

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Consumers Unconvinced UPC in Their Best Interest

(Continued from Page S/2)

purchase decisions.

Industry has also said that item pricing would significantly reduce the cost savings inherent in the electronic checkout system. To the contrary, the Ad Hoc Committee of the Grocery Industry for the Development of the UPC indicates the potential savings from non-item pricing is only a small percentage of total savings. An analysis of Giant Foods' study to determine the tangible dollar savings demonstrates that only 23% of the potential savings would result from the elimination of price marking.

Additionally, an analysis by Donald Snyder, a consulting economist with the Public Interest Economics Foundation in Washington, D.C., also showed that the expected savings per shopper would be only $1.13 to $2.27 a year with a system of non-item pricing. Consumers would willingly bear that burden for the retention of one of their most basic rights.

Lastly, industry has hailed the detailed cash register receipt as a substitute for item pricing. This is faulty reasoning. The consumer cannot use the tape at the checkout counter to ensure the correct price is flashed, and the tape cannot be used to comparison shop within the store. The tape is made possible by the electronic equipment; it was not devised as a substitute for item pricing. The consumer should be entitled to both.

Shopping Effectiveness

The question arises as to whether consumers' resistance to the UPC is merely stubbornness or a realization that it will decrease their effectiveness in the marketplace. A study conducted for the grocery industry committee bears out the latter. Concerning price recall, shoppers in UPC stores correctly recalled the prices of items in their shopping baskets 56% of the time, while shoppers in conventional stores correctly recalled the prices 71% of the time.

Over time, the results were even more significant. Over a six-week period, the study found that UPC shoppers reported incorrect prices for seven out of 10 items much more frequently than did conventional store shoppers. Since one of the supposed advantages of the register tape was that it would aid shoppers in price recall and comparison over a period of time, this finding is all the more important.

The ineffectiveness of the tape is borne out by the next finding. Only 5% of UPC shoppers used the register tapes at home, compared with 41% of conventional store shoppers who used the prices marked on packages in the home as a reference for price comparison.

The grocery committee recommended that individual items continue to be price marked. Unfortunately, a number of supermarket chains have indicated that they still will experiment with the removal of item pricing.

Federal legislation has been considered which would mandate item and unit pricing. Some state and local governments have already mandated this.

But in the end, it may be consumer preference that necessitates item pricing by retailers. For the committee study also found that 17% more UPC shoppers than conventional shoppers were store switchers.

Stein is a state family economics and management specialist for the department of family economics and management, University of Missouri, Columbia, Mo.

Entry Paths Lead To Multimedia System

(Continued from Page S/9)

When an optical reader (for reading bar codes, marks, printing, typewriting and handprinting) is combined with the multiterminal minicomputer system to form the multimedia system, we have the best of both worlds: We can process optically readable data with data that needs to be entered through a keyboard and do it economically. What is more important, the optical unit can be a small hand-held unit for capturing retail sales or item movement at the source. The optical reader/keyboard terminal, therefore, becomes another element of the minicomputer system.

The portable data recorder represents yet another means for capturing source data. Quite similar to keyboard-to-storage terminals, its key features are low weight and portability, which allow data capture in the field. Once such data is captured, the recorder can be used to transmit the data to the minicomputer controller over telephone lines.

An exciting new means of data entry is voice data entry. The ability to capture information by voice recognition opens up new horizons to source data entry for it permits persons to simply speak into the system (quality control, material movement or the cashier). While it is presently limited to a small vocabulary, its future expandability is obvious. Again, we find voice data entry as an element in the overall source data entry picture.

Another data entry possibility is the small business computer, which was introduced after the minicomputer arrived on the scene. Business-oriented program languages, application software, multiple terminals and multiprogramming concepts all have enhanced the small business computer. But it is not only for the small businessman. With data communications, it can provide a large company with a means to enter and process data remotely and that is exactly what is happening.

Point of Convergence

While many of these data entry options seem diverse, they tend to all converge into the concept of a multimedia, multiterminal system whereby data generated via various media can be captured by the system with minimum human intervention. Major components of such a system could include typewriter keyboard, optical reader, voice recognition unit, minicomputer controller, business programming language, magnetic disk, tape, printer and data communications interface.

Obviously, there are going to be systems that possess a variety of capabilities to suit the needs of various users. The central idea is that instead of asking the human to conform to the computer's requirements, now we are asking the computer to accept whatever the human generates.

When such a system is placed in a distributed processing environment, we have a completely flexible means of capturing data wherever it is generated and in whatever form it is generated.

Feidelman is president of Management Information Corp., Cherry Hill, N.J.

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Mini-Based System Digests 'Whopper' Consumption

By Nancy French
Of the CW Staff

BOSTON — The food service at a Burger King restaurant isn't the only thing at the shop that is fast and efficient.

Sales accounting and inventory have been made equally efficient and simple to control with an electronic cash register system developed by AMF Corp. for Burger King's company-owned restaurants nationwide.

At the Burger King restaurant next door to Boston University here, "hosts" and "hostesses" keep track of all the Whoppers, Yumbos, french fries and onion ring orders with an 8K minicomputer installed under the counter.

When a customer places an order, Burger King hostesses key in the menu items using preset keys on the AMF Manex terminals.

They then call the names of the items ordered via microphones to the back of the store where short-order cooks prepare the items and hand them over the counter after they've been wrapped in styrofoam and paper.

When the preset keys are hit, each item is automatically priced and the register totals the items ordered and computes the tax. A tiny printer built into the system prints a paper tape for the customer, according to Harold Bechtloff, Manager of Burger King's Division of Operations Systems Management in Miami, Florida.

Inventory Control

At the same time, a Digital Equipment Corp. PDP-8M mini explodes the menu items down to their ingredients — bun, meat patty and slice of cheese, for example — which are recorded in units, and tomato and lettuce, for example, which are recorded in ounces.

This data is stored in main memory, Bechtloff said.

Neither ketchup and mayonnaise nor paper products and cold drinks are counted this way, according to the Burger King assistant store manager here. These items are all handled with physical counts, he said.

In this manner, the restaurant can maintain a perpetual inventory of every food item Burger King uses and, if necessary, take an audit at a minute's notice any time of the day or evening, the assistant manager explained.

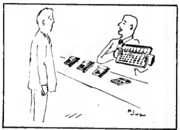
Cash sales are recorded by hour of the day, cash drawer, menu item, total sales and total tax, according to Bechtloff.

Dropped patties or buns are dumped into a box where they can be counted at the end of the day. Waste as well as employee lunches are entered into the system using the void key.

At inventory time, the store manager punches the inventory button on any register and keys in menu items one by one to obtain total cash sales for each item as well as total sales for the day, he said.

He then compares the ingredients recorded on the paper tape with the physical inventory on hand at the opening of the business day — newly delivered items, waste as well as all food left over in the refrigerators, the assistant manager indicated.

After inventory is taken, the registers are "reset," which automatically places the system in communications mode, Bechtloff said. Sometime during the night, the chain's Burroughs Corp. 3700 system in Miami polls each of the chain's 400 company-owned restaurants in order to prepare consolidated reports.



'. . . Eight Digits, Four Functions, No Batteries and Cheap.'

The system was purchased in 1972 after a year-long study in which the firm took 50 pages to document its specifications, Bechtloff explained.

"Back in those days, only Honeywell and AMF offered the type of system that met our needs," he said. "But Honeywell provided contract maintenance only from 8 a.m. until 5 p.m., five days a week.

After 5 p.m. and on weekends, maintenance cost extra — $35 per hour," he said. "That wouldn't do because we're open 16 hours a day, and Sundays are our best days," he said.

"AMF offered contract maintenance seven days per week from 7 a.m. to midnight, so we went with them," he explained.

"In today's marketplace, there are many new systems that would do just about the same job as our system does — Sweda, for example, came in after we made our decision," he said.

Accurate and Reliable

"It's about as accurate [a system] as you could expect," according to the assistant manager of the restaurant here. "The only thing we come out short on is tomatoes — that's because some parts of the tomatoes — the ends — can't be used," he said.

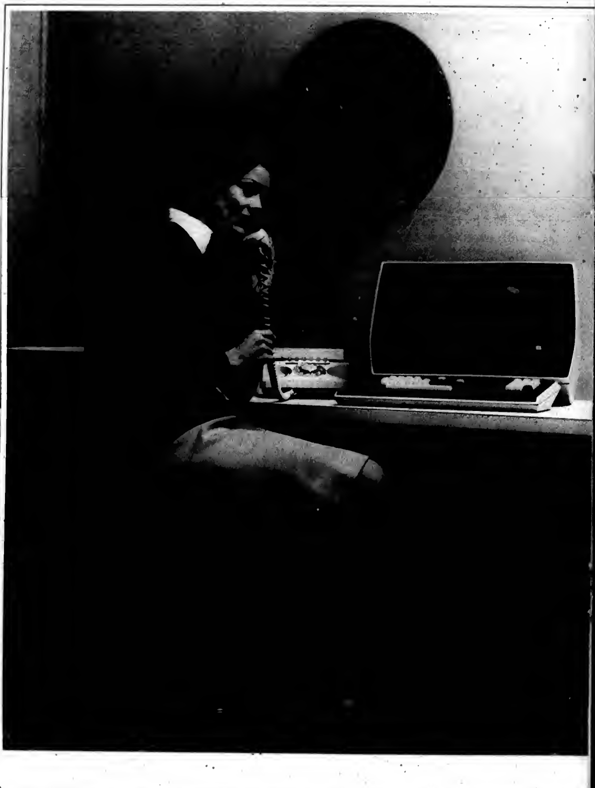
And the system is pretty reliable too, he added.

Asked about breakdowns, the assistant manager said the system "seldom" goes down. However, he admitted it went down perhaps once in six months. In such cases, he relies on the physical count for any period of time the information is lost. Now that the mini has been installed on a separate electrical line, the restaurant experiences no more problems with irregular current, he indicated.

Before installing the Manex system, Burger King relied on a mechanical AMF Multi Check System tied into the Burroughs mainframe, Bechtloff said.

This required keeping a ticket for each sale. At the end of the day, the tickets were added up. Only units were kept on this counter which was somewhat less accurate and made more work for the local restaurant managers, Bechtloff indicated.

Burger King will soon upgrade its B3700 to an IBM 370/148 at the recommendation of Pillsbury, the firm that owns Burger King.



Custom Forms Reduce Service Bureau's Keying, Costs

By Esther Surden
Of the CW Staff

CLEVELAND, Ohio — A service bureau specializing in property management here credits manual data input through a variety of custom-designed forms with reducing the amount of keying it does, while holding the line on costs for its clients.

The firm is an IBM 360 shop. "Basically our company deals with people who manage large volumes of real estate," Sidney R. Goodman, president of Management Reports, Inc., stated. "Our initial approach was the same as everyone else in the business — most of the accounting and recordkeeping was handled in the central office."

However, the system proved inadequate when dealing with large management companies with properties scattered over several states. The cost of putting a terminal hookup at each of, for example, 50 properties scattered throughout three states and the need for those terminals to have access to data at all times would have been too costly, he indicated. And the sites just did not have the personnel to operate a terminal, he added.

So the company came up with an alternative route. In response to one of its clients, the firm developed specialized forms that can be manipulated on a pegboard so that the manager of each property receives an up-to-date record of tenant status while the service bureau receives a document, made at the same time, that reduces keypunching to a minimum, Goodman said.

"One of the requirements was a tenant ledger card that would give a tenant history as well as a manual way of inputting to the computer," he stated.

No Middleman

The system has eliminated the need for a middleman, Goodman indicated. With most systems a oroperty manager sends the information to a home office where a skilled clerk codes the information for input into the system. "That goes into the system and then the reports are generated. But by the time the reports are generated the information is history," he said.

"The problem was to provide some way a manager could record information, do it almost without error, prepare the computer input and simultaneously prepare all the information necessary to manage that property," a tall order the company feels its forms fill.

"The ledger card had to act almost like a computer terminal for the user, giving him everything needed on the spot. With a normal ledger card system, computer input is not prepared," he added.

The company developed a closed loop document system in which all the information for the coming month is printed on one document — a "rental" notice which is mailed from the service bureau to the property each month.

"The properties use the 'rental notice' in conjunction with the ledger card and a couple of other documents to record the month's transactions, and as they record them they are simultaneously preparing computer input. That document is then batched and sent to the data center each day. It's not necessary for it to go to a home office and be transcribed," Goodman stated.

The "rental notice" comes off the computer, the computer holes are then stripped and it has pegboard holes, he explained. If the information already on the "rental notice" is correct, the manager records it on the "ledger card" and tells the service bureau that the manager agrees the information is correct.

If the manager disagrees, he puts the difference between the correct price and the incorrect price in a space on the rental notice.

At its data center, Management Reports has an IBM 360/40 with seven Calcomp disks and four Telex tape drives. A nine-station key-edit key-to-disk system is used to finally input the data into the system.

Cash Management Helps California Earn $200 Million Annually

SACRAMENTO, Calif. — An improved method of entering data on cash transactions is helping the state of California earn over $200 million every year through tighter cash management.

The state's interest earnings under the management program on the short-term investment of funds flowing through its nine bank accounts was $219 million for the fiscal year ending last June; the figure for just the first six months of this fiscal year stands at over $114 million, according to Jesse M. Unruh, state treasurer.

Striking as this figure is in itself, it is even more welcome to state officials and taxpayers when compared with earnings of about $100 million four years ago.

The improved data entry methods center on a problem familiar to most adults: reconciling a bank balance. It's complicated by the fact that state agencies make deposits in over 500 accounts for credit to treasury checking accounts maintained in nine large commercial banks.

Every day, banks throughout the state cash anywhere from 25,000 to 200,000 checks issued by state agencies. This adds up to a daily average cash flow of $500 million to $600 million through these accounts.

The Treasurer's Office cannot invest much of this cash unless it knows exactly what the current balances are. To be useful in the investment program, the balances must be known by 4 p.m.

Unruh called the process "a daily race against the clock."

Before introducing the new methods, the Treasurer's Office was able to meet its afternoon balancing deadline an average of only one or two days a month. Within four months after switching from punched cards to a "mixed media data entry system," the average jumped to 12 days a month.

The documents are now computerized by a Burroughs Corp. magnetic ink character recognition (Micr) system that very rapidly "reads" the information encoded on checks and warrants.

To handle rejects, the Treasurer's Office installed a CMC-5 keyprocessing system built by the CMC Division of Pertec Computer Corp. A built-in minicomputer is "dedicated" to speeding up the data entry operations and making them more accurate," Unruh said. The CMC-5 also balances the batches of checks and warrants it processes.

These and other streamlining techniques have helped the Treasurer's Office meet its account reconciling deadline about 10 times as often as it did under the punched card system, he added.

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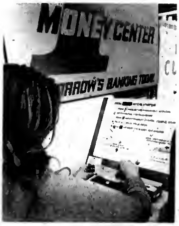
'Money One' Verifies Checks for Banks, Retail Stores

By Ann Dooley
Of the CW Staff

CAMBRIDGE, Mass. — The First National Bank of Boston has introduced a check verification system called the Money One System which verifies payroll, government or personal checks for cashing at a network of retail stores and banks. It eliminates the need for stores to maintain files and other records at each location on people who have check cashing privileges.


CW Photos by A. Dooley

Customer inserts check into Money One terminal at Broadway Supermarket.

The Money One System began in September 1976 and now has over 100 banks and 23 grocery stores or chain stores as members. Over 135,000 cards have been issued, 60% of them through participating grocery stores. Over 300,000 checks have been cashed and less than .3% have bounced, according to a spokesman.

Broadway Supermarket here joined the system in mid-December 1976, and store manager John Lichter is pleased with the system, although he does have some reservations.

"I hate machines myself, but in general the system does work," Lichter commented. "The system gives our customers added service with longer hours and more convenient check cashing stations, and it also saves us from taking in so many bad checks", and keeping so many records, he said.

The individual customer does not pay for the service, but participating banks are charged by First National for each card they issue and stores pay on a per transaction fee rate. Stores can pay for the verification service only or can pay extra for a guarantee service in which Money One will cover any check it approves, regardless of whether it bounces later.

Money One limits each customer's check cashing maximum to $75 per check and $200 per week for personal checks and $250 for payroll or government checks.

Secret Code

When a customer applies to the system, he is given a card with his name and a personal identification code. The code, known only to the user, is scrambled in the central computer and cannot be retrieved by anyone. If the card is lost or the code forgotten, the customer must reapply for a new card and code.

Customers access the system through an NCR 279 terminal which has been modified for customer check operations. The users key in the pertinent information; then the data is transmitted over telephone lines to an available IBM 370/155 or 158 at the First National Bank's headquarters which identifies and verifies the check.

The user's status information is relayed back to the terminal and the back of the check is stamped with the status report. The customer can then go to a cashier and cash the check if it has been cleared.

If the stamp on the back of the check indicates previous checks have been bounced and not made good or if the user has exceeded his limit, it is then up to the discretion of the store manager to cash the check or deny the customer that privilege.

The information in the data base indicates only if there are any checks bounced or if the user has exceeded his daily or weekly limit; no extensive personal files are maintained.

Broadway Boom

Broadway Market has 2,400 cards issued and cashes more checks than larger stores, Lichter said.

Previously, Broadway maintained a manual file system to keep track of bad checks. "I'm not so sure that was a bad system," Lichter said.

"Money One will help us in some ways but not in everything," he said. "It won't save us much extra time for one thing," he indicated. "We used to have the checks approved at the courtesy booth which would tie up only one counter. Now the checks can be cashed at any counter so it slows everything down slightly, although it relieves the courtesy booth," he remarked.

Under the old system Broadway had file drawers filled with the names of people who bounced checks. Last fall, the drawers had reached 5,000 names outstanding over a two-year period. "That's when we decided to computerize," he said.

"The system isn't going to be that great a money saver for us, either," he said. "We've always been fairly restrictive about cashing payroll, government, out-of-state and no more than $10 over the amount of purchase checks, so we never lost as much as other stores in bounced checks," he said.

Broadway Market is near Harvard University and serves many students and professional working people in the area. "We had more customer resistance than most other places to the Money One System," Lichter said.

Besides the expected opposition from those people who resist any change or those who had trouble operating the terminal, the main source of complaint was from people who disliked computerization, resented disclosing their Social Security Numbers and resistance because of invasion of privacy, he said.

Cashier Training Sessions

The cashiers went through training sessions to learn how to operate the machine and instruct others in doing so, Lichter said. "The cashiers sometimes prefer the system, but it depends on how many problems they had with it that day," he said.

Money One claims that downtime has been less than 2% overall, but Lichter said there had been a lot of problems with it when it was first installed. "Lately it's been working fine, but unfortunately it happens to be down right now," he explained.

"It's worst for us when it happens at 5:00 in the afternoon with the dinner rush coming on and people backed up waiting for it," he said. "It's usually down for five minutes but it can seem like the longest five minutes in the world," he observed.

"The system has actually complicated my job a little. I've gained a little extra book work because I have to keep track of the

(Continued on Page S/19)

Customer slides his Money One card through slot in terminal to begin check verification process.

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Increases Retailers' Productivity

Standard Source Marking Code Gaining Acceptance

By James R. Williams
Special to Computerworld

The National Retail Merchants Association's (NRMA) universal vendor marking program (UVM) has been instrumental in the general acceptance of a standard optical character recognition (OCR) type font.

From the onset, however, the association's goal in undertaking its source marking project has remained unchanged. It is to propel the general merchandise industry into a new age of increased productivity.

The standard, adopted by the general merchandise industry in 1974, uses Optical Character Recognition-A (OCR-A), a machine- and human-readable technology. Its application in UVM has the potential of putting merchants in complete control of their inventories.

Source marking can reduce store marking costs, expedite goods to selling floors and provide improved sales data for retailers and manufacturers of the wide variety of merchandise sold in their stores, from apparel to home furnishings, luggage, shoes, toys and more.

Earlier, NRMA played a leadership role in the near-decade of study that led to the selection of OCR-A. The association assembled one of the most highly skilled research and development teams ever dedicated to an individual industry-wide assignment. To harness technology for general merchandise retailing took top talent from more than 20 NRMA retail firms operating over 7,000 stores, and the expertise of engineers from leading equipment manufacturers.

Codes Evaluated

After all other machine-readable language codes were evaluated, OCR-A was selected as the standard best suited for the general merchandise industry's. diverse needs. A major factor in the choice of this technology was its readability by people and machines which makes it viable as a means of identifying stores' merchandise as well as customers and employees. In the future, OCR-A can be used on credit cards, purchase orders and invoices used in the retailing environment.

Important also was OCR-A's reliability which had been tested through its wide use by industry and government. Moreover, as a printable technology in the public domain, it could be easily reproduced in a variety of forms by readily available imprinting methods.

As work continues on source marking, the association's role is educational. NRMA's special UVM program is reaching out to various markets to explain the many productivity-enhancing ramifications of this new technology.

Interest on the part of retailers, merchandise and equipment manufacturers is building as a result of presentations at industry meetings, mail distributions of explanatory printed materials and personal consultations at the store and manufacturing levels.

Recently, to alert manufacturers to retailers' strong commitment to UVM, the NRMA spearheaded a direct mail campaign. The letter, signed by 17 well-known store principals, informed 4,000 vendors, representing 10 major merchandise categories, that their companies were actively involved in the use of OCR-A for the identification of goods to be sold. It also stated that more and more retailers will be requesting on their purchase orders the marking of items with OCR-A.

Reading Materials

A number of publications offer assistance in understanding and implementing this new technology. Basic information can be obtained through the "Voluntary Retail Identification Standard Specification-A," written right after the industry adopted OCR-A. Booklets on the standard and UVM are also available upon request.

The first "Compendium of OCR-A Related Products and Services," published recently, helps retailers and merchandise manufacturers appraise this new technology in terms of their own needs. It provides a base knowledge of available marking and reading products or services to permit selection of the option best suited to individual data retrieval systems.

Nearly 50 products and services are described in this new reference. An equal number or more are expected to be included in the next few months. Subscribers will be informed of added entries through periodic updates.

For some time now, tests conducted with OCR-A have produced favorable results. Two of the nation's largest chains, Sears Roebuck & Co. and J.C. Penney, have been employing this technology for more than a year in merchandise identification. Sears has 10,000 wands in use for recording information, and Penney's program is equally ambitious. These chains are estimating that wand reading cuts the time of total transaction by 20% to 30%.

In an experiment involving a branded manufacturer, Levi Strauss, and Foley's, a traditional retailer in Houston, Texas, print quality was deemed excellent. Wand reading was also found to be 50% faster than keying.

As acceptance grows, the toy manufacturer, Mattel, has announced that OCR-A will begin appearing on its packaging this year — with about 90% of the firm's goods marked by late 1978. Luggage manufacturers, among the first to support UVM, are working out such technical details as where and how to ticket their items.

In the apparel industry, Bobbie Brooks, a major manufacturer of coordinated junior sportswear, is the first company to adopt this standardization system. In a recent announcement, this firm stated plans to employ UVM on merchandise manufactured under its label as of its holiday 1977 line.

In the past, skeptics said implementing a standard in an industry as diverse as retailing would be difficult. But the mounting acceptance by vendors and stores proves they were wrong. The time for increased productivity in retailing has come.

As manufacturers and retailers encounter problems along the way, NRMA's role will be to try to solve them, as it does now in dozens of areas for its 35,000 store members in the U.S.

Williams is president of the NRMA.

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Intelligent Terminals Speed Box Maker's Cost Estimates

ALTON, Ill. — A corrugated box manufacturer is using intelligent terminals to collect the specifications needed to give price estimates on customized boxes.

The files the terminals construct for the estimates are in turn becoming the source data used to prepare orders, dray tickets and invoices, effectively eliminating the need to reenter much of the same data during production stages.

To speed the return of completed estimates to its plants, Alton Box Board Co. installed 15 Sycor, Inc. 350 intelligent terminals at its Container Division plants and a Sycor 350 master station at its headquarters here. Requests for quotations on custom boxes are completed overnight by an IBM 370/115 at headquarters and sent out to the 15 plants the next morning.

The Sycor 350 terminals replaced IBM 3735 terminals. The 350s have proven to be faster, cheaper and more flexible than the terminals they replaced, the firm said. Based on the success of the estimating order entry and invoicing system, Alton has added programs for payrolls, roll stock inventories and budgets.

Before work on a customized container begins, Alton salesmen thoroughly discuss the nature of the product to be shipped and shipping conditions with the manufacturer. The request for a cost estimate which results from these meetings can be for a container as simple as a soup carton that opens at a 45-degree angle to facilitate access to the soup cans, or as elaborate as a display stand that requires intricate die cuts during manufacture.

The resulting request for an estimate notes such things as bursting strength required, type of inner and outer liner board, type of flute in the corrugation, single or double wall corrugation, and moisture proofing of the container. Other features noted on the estimate include interior partitions, a common though expensive variation which prevents bottles from breaking during shipment.

tles from breaking during shipment.

The most important factor in determining cost is the complexity of the work required to make a particular box. This includes die cuts, scores, hand holds, glued, taped or stitched manufacture joints, method of shipping the boxes to the product manufacturer and the distance shipped to the manufacturer. As is customary in the container business, the estimates are made on the basis of cost per thousand boxes.

"When a customer asks for a quote on a container, the details are entered on the plant's terminal during the business day," Ron Cranford, assistant controller of Alton's Container Division, said. "During the night each plant terminal is polled by the master station at headquarters, using an auto-dial feature.

"Data is brought on magnetic tape from the master station to the 370/115 where box specifications are compared with the plant's standard labor and material costs, and then an estimate is prepared. The completed estimates are transmitted back to the unattended 350s at the plants and stored for printing the first thing in the morning. All data is printed out on Sycor 80 char./sec matrix printers," Cranford added.

To avoid repetitive data entry, the estimate data is the base for the rest of the order-invoicing system. To enter an order, the estimate serial number and the order entry variable information is input onto the terminal. All of the fixed or constant information is extracted from the estimate file to complete the order entry information. From the order entry information dray tickets, sales orders entered and backlog reports are printed.

Shipment of the completed order from the plant starts the invoice on its way to the customer. From a copy of the dray ticket, the 350 operator keys in the shipping variable information, triggering the invoice process.

As the mainframe processes the data from the 15 plants, it assembles the processed data into blocks going to each of the plants. Data

(Continued on Page S/19)

True Data Entry Comes Via Voice

(Continued from Page S/4)

try.

All of these examples are real. There are hundreds of them in operation using equipment such as the Threshold 500 voice data entry terminal. The important thing to remember is that each of these terminals is only a tool — a piece of peripheral equipment that goes with the user's computer system. But it is perhaps the most important tool yet developed for eliminating the high repetitive costs of data capture at the worker level.

Systems costs won't change necessarily, but the cost of operating a system — in terms of manpower utilization, error elimination (rather than correction) and time reduction — is drastically reduced using voice data entry rather than some traditional form of "source" data entry that isn't truly data entry but data collection.

Popky is a director of marketing for Threshold Technology, Inc., Delran, N.J.

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Funds Available in One Day

Voice Response System Facilitates Cash Consolidation

BIRMINGHAM, Ala. — A southeastern businessman with 11 manufacturing facilities discovered he had access to $4.5 million nearly two weeks sooner using the First National Bank of Birmingham's computerized cash consolidation system with voice response.

With this system, collected funds are generally available within one day, whereas it sometimes took several days or even weeks to consolidate previously. The availability of such amounts of cash can represent as much as $300,000 a year in additional revenue for a company, according to Michael C. Underwood, First Birmingham's commercial loan vice-president.

Basically the system gathers and processes data on cash deposits made in local banks at distant locations, then consolidates this information for use by a central bank. Thus, credits for collected funds can be posted to a client's consolidation account hours after cash receipt, rather than days or weeks later, he explained.

By knowing the amount and location of cash in its possession, a company can hope to capitalize on a wide variety of short-term investment opportunities to earn additional revenues or pay off existing loans and decrease interest costs.

The applicability of a computerized cash consolidation system is far reaching since many companies have geographically scattered business locations. First Birmingham, for example, services retailers, a wholesale parts distributor, a supermarket chain, an appliance company and a large conglomerate, he noted.

The heart of the system is Votrax, the synthesized human voice of General Electric's computerized Telephone Information Processing Service (TIP), which serves as a computer terminal for data entry into GE's Mark III remote computing network. Using a standard push-button telephone, the user gets a spoken answer from the remote computing service which processes the bank's cash consolidation program. Votrax requests data from the user and speaks answers resulting from computer processing.

Receipt Confirmed

For example, one customer, a retail outlet manager, reports the daily deposit he makes in a local bank to First Birmingham, via a toll-free telephone number available 24 hours a day. The retailer telephones the computer and responds to Votrax "voice" requests for input data. Votrax asks the retailer's company identification, location code and deposit amount. After each item is entered, it is repeated by the computer voice so the retailer can determine if it has been received correctly.

The computerized cash consolidation system automatically produces depository transfer drafts for the amount of branch location deposits to local banks, Underwood said. It also provides a means for branch locations to report those local deposits. In this way, all of the company's funds are automatically concentrated in one bank account.

A company treasurer no longer has to keep track of a multitude of small deposit balances and he can automatically obtain an extensive series of reports. Paperwork problems that could delay transfer clearings are virtually eliminated and there is very little chance of error, he said. In addition, the system lets the company's management know almost immediately which locations are not reporting, which could reflect a problem, he added.

Customers also can use the TIP telephone inquiry to determine their company's total deposit amount each day after all locations have reported.

According to Underwood, the system is well worth the initial development cost, which amounted to less than $2,000, and is now running at a break-even cost to the bank. The service has helped to project a modern image for First Birmingham, and as a result it has cemented close relationships with a number of clients, which has helped increase business for the bank in other areas. More than $25 million each month is cleared through the system, which is administered by one person in just 30 minutes a day.

Votrax is manufactured by Vocal Interface, a division of Federal Screw Works. It produces electronically synthesized speech and is designed to convert the output of a computer or other digital device into electronically synthesized human speech.

This conversion from digital information is accomplished through a unique patented electronic design which produces words and phrases using phonemes, the basic sounds which make up spoken language.

In the TIP system, the Votrax unit translates 8-bit computer codes into 63 different voice sound particles, each varied by four possible inflections. These sound particles are linked together to form words and sentences. Since the voice is not prerecorded, an extensive vocabulary is available.

Terminals Speed Cost Estimates

(Continued from Page S/18)

within these blocks is organized so that data which can be printed out on highest usage print form is transmitted first. When clerks arrive at the plants in the morning, they find this data already printed out. This saves about one hour of printing time per terminal during the working day. After the operators arrive, the special forms, such as the invoices, are fed into the printer.

Since the 350s were installed early in 1976, programs have been added for a raw materials inventory system (roll stock inventory). The 3735 terminals could not have handled this application because of their limited capacity, which was already taken up by the estimating, ordering and invoicing system, Cranford indicated.

"Our general requirements were 500K to 600K of storage, ability to poll the network off-line and transmission speeds of up to 4,800 bit/sec," Gus Nelson, DP manager said: "The 350 met or exceeded all these requirements, with 500K of random-access memory standard, expandable to 1M characters with optional diskettes; 16K bytes of programmable read-only memory; and 4,800 bit/sec using binary synchronous transmission."

Although the IBM 3735 terminals and the Sycor 350 operate under the same system concept, the Sycor terminals have proved faster, have greater storage capacity and cost less than the IBM terminals they replaced, Nelson said.

'Money One' Verifies Checks for Retailers

(Continued from Page S/16)

Money One users, the customers from our old system who haven't switched over yet and also people who write a check for the amount of order," he noted.

"Also, when the system goes down, I have to be out by the terminal explaining to customers why they can't use the system. I also have to handle customer complaints about anything you can think of concerning the system," he said.

"All this takes me away from my daily work," he added.

"While there are some disadvantages, I'm glad we computerized," he said. "The service is good, a repairman comes right away and also checks in once a week, we don't have to keep up such extensive manual files, we have a check guarantee and we're offering the customer extra service," he said.

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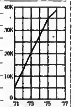

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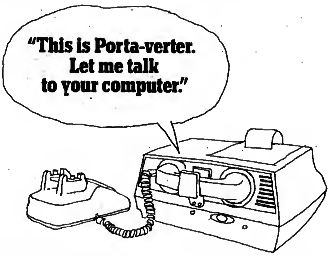
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Using Series of Reports

Operator Performance Can Be Judged Without Standard

By Jerome L. Byrum
Special to Computerworld

Yes, Virginia, you can evaluate the performance of data entry operators without maintaining standards. This is possible with a series of reports which permit an examination of individual and group activity.

A traditional problem has been how to establish a job standard accurately and fairly in the first place. Secondly, the verifying operation seems to be a shade faster than original entry, or at least this task is so distributed to the more proficient operators. Thus, two standards are required for each format — one for entry and another for verification.

Standards become obsolete quickly. When is it necessary to revise the standards? What is the basis of the new ones? Why is the revision necessary? Did the people mix or job mix change? Did the operators become more adept at the jobs' because of more experience or better equipment? Is it fair to raise the standards for those reasons?

When the validation of standards becomes more time consuming than the job of supervision, it is time to look for a better idea. Why not allow the standards to seek their own levels, just as water does? Let the standards define themselves.

Experience levels and job mix are always changing. It seems reasonable to allow the standards to do likewise. In bygone days of keypunch performance analysis, production statistics were recorded manually by the person who actually did the work.

Today, the very machines which are used to record the data also record the who, what, when and how much automatically. Doesn't it follow that this recorded set of statistics should be processed with a minimum of "outside" human interference?

Eliminating the need for standards will certainly free up time for supervisory people to concentrate on things such as productivity. Rather than comparing individual effort with an arbitrary standard, we begin to focus our attention on the overall performance of the group.

The main objective of this particular technique is to provide the data entry supervisor with information which highlights problem areas without the need to constantly tune standards.

The input transaction to any system which attempts to measure data entry performance is simple. The date, job code, operator identification, entry or verify indicator, the output count — preferably in strokes — and the elapsed time are needed.

With the basic transactions described above, it is possible to provide a complete analysis of individual and group productivity, as well as job and application analyses. The reports can cover daily, weekly or monthly activity.

Five reports are used:

- Activity Summary by Day.
- Individual Operator Analysis by Job.
- Job Analysis With Individual Operator Ratings.
- Summary of Weighted Ratings by Individual Operator.
- Major Application Summary.

Report Descriptions

The common detail line for reports 1, 2, 3 and 5 contains the following information:

- Strokes, hours, strokes per hour for entry function.
- Strokes, hours, strokes per hour for verify function.
- Sum of enter and verify hours.
- Other hours. Clerical work associated with a particular job. At Carnation Co., we add 7.5% to allow for stamping, filing and retrieving documents.
- Total hours.
- Percentages. We have found that for every hour worked in our data entry section, 70% is spent keying and verifying and 30% goes to dispatching, training, document control and so forth.

The reports are printed in these sequences:

- Activity Summary by Day — One line per calendar day of input. Could be further broken down by shift. Also a total line representing the period covered.
- Individual Operator Analysis by Job — Job within operator. The first page is a summary of all operators, one job at a time. Subsequent pages are for each operator, showing all jobs worked during the reporting period.
- Job Analysis With Individual Operator Ratings — Operator within job sequence. The first section is a summary of all jobs, one operator at a time. Subsequent sections show how each operator performed on a common job, with ratings calculated from group average.
- Summary of Weighted Ratings by Individual Operator — Operator sequence showing the weighted hours vs. the actual hours used to accomplish all work, based on the ratings calculated in report 3. This report attempts to rank the overall effectiveness of each operator.
- Major Application Summary — Where individual jobs are related to major applications, such as customer maintenance and invoicing being combined as sales.

How to Compute Ratings

Individual operator ratings are calculated for each job. A separate computation is made for entry and verify functions. The strokes per hour are computed by operator for each job. Group total strokes and hours are accumulated for each job.

The group (all operators) strokes per hour is determined by dividing total hours into total strokes. This becomes the group average strokes per hour. This factor is the standard of 1.0. We then divide the individual's strokes per hour by the group average, which will reveal that operator's performance relative to 1.0.

This performance quotient is then multiplied by the actual hours on that job to arrive at "weighted hours," or how long it would have taken the group to accomplish the same amount of work. The actual hours and weighted hours are accumulated by operator for a later computation of weighted ratings, at which time total performance is displayed for comparison.

The reports are compact. A complete set for a month is printed on fewer than 30 pages of stock forms.

Byrum is information services manager at Carnation Co.'s Southern California Division in Los Angeles.

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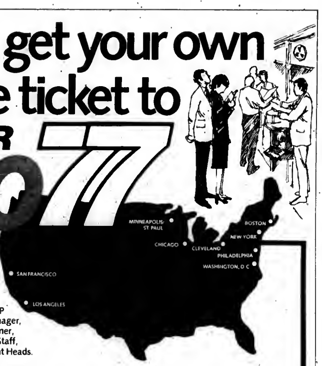

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Winning Over Employees First Step in Installing FDC

ONTARIO — More and more manufacturing firms are switching to factory data collection (FDC) methods that gather data from the "floor" of a manufacturing plant. Sometimes the greatest obstacle to the installation of an FDC system is the fears of the employees rather than a lack of technology.

The Sierra Research Corp. of Buffalo, N.Y., recently installed a shop floor information system at the Canadian General Electric Co. here. Sierra used a specific strategy in introducing the system to the employees who would have to interact with it daily.

Their program included a seven-month phase-in program during which plans to secure the cooperation of both foremen and workers alike were used.

One of the first steps Sierra undertook was to ensure that all employees knew that the top management had developed and supported the new system. They also let the employees know that the installation of the system would eliminate some unpleasant tasks, such as the handwriting of job tickets, hand-calculation of elapsed time and misplaced time cards in clock card racks.

Sierra also pointed out that successes should be highly publicized and failures quietly corrected. Production workers experiencing difficulty with terminals should be corrected in private in their foreman's office. Departments and individuals with good performance should be recognized, the firm said.

Phase-In Technique

Part of the plan included phasing in the simplest procedures first, with those people most likely to learn quickly. Applications and personnel reporting are then expanded as capabilities are proven. Most importantly, the first-line supervision (foremen) must be the focal point of the entire implementation effort.

The foreman's acceptance of any shop floor FDC system is the key requirement for success, Sierra indicated. His full cooperation and enthusiasm is necessary, since basic recordkeeping is frequently his responsibility.

The cooperation of the foremen is usually improved when they realize the system's ability to: eliminate tedious and time-consuming error correction of hand-written documents; update production reports through current production, instead of days or weeks late; help resolve pay disputes over employee pay hours with more accurate information available on the shop floor; and eliminate the need for handwritten absence reports. Additional cooperation is often secured by using the foremen to explain the operation and advantages of the system to plant visitors.

Milestone Per Month

Each month in the seven-month installation plan had a specific milestone, the first month's being the functional system design and establishing the physical installation requirements.

During the second month, complete detailed system design took place with detailed traffic and volume studies and the design of the system and interface to the host DP system.

The assignment of the physical location in the plant took place during the third month. Additionally, the cards, badges and other physical equipment were designed and the preliminary tests of the operating system for the host CPU were undertaken.

The fourth month marked the final systems test. The supervisor education program began and the detailed conversion plan was finalized. Whenever possible, the new media were put into use and employees were scheduled for badge photos.

All wires, card racks, stands and other physical equipment were in-house by the fifth month. Employee instructions, manuals and notification letters were finalized. The foremen began training the workers and clock numbers were punched in employee badges.

Preliminary employee instructions were distributed to employees during the sixth month. Wiring and other physical equipment, as well as the CPU and terminals, were installed.

The employees received their badges and began time and attendance reporting during the final month. Production reporting was also begun.

The operation at Canadian General Electric consists of a Sierra SDA-770 with over 30 terminals on-line to a Honeywell Information Systems, Inc. 716 minicomputer.

With the system, each employee has a badge which he places in a slot, enabling the terminal to read the badge number. The correct time, terminal number and similar information is added to the report by the mini. The employee puts in the job card to provide fixed information about the job he is about to do and enters the variable information.

All information entered at the terminal is checked for accuracy by the mini as it is transmitted, rather than after an entire message is sent. This eliminates the need to reenter good data that preceded an item in error.

Error Correction

For example, if an incorrect part number is keyed and entered, a red error light comes on (or an optional buzzer), and the terminal will accept no more data until this error is corrected. By depressing an erase key, the production worker erases the erroneous part number and the terminal is reset to accept a correct part number. The words "part number" are lit on a tutorial display to indicate the information required. Badge numbers, shop order numbers or other information previously entered correctly need not be reentered.

Validated information goes directly to the CPU and is used in many ways. Production control uses it for an up-to-the-minute picture of work done, backlog and shop loading. Cost accounting uses it for daily variance reports and cost analysis. Time is automatically charged to each shop order for the accurate recording of costs. Payroll uses it for the weekly payroll.

Production control has realized a significant improvement. The status of any part can be known immediately by keying in the part number at one of the terminals on the factory floor. More detailed information can be obtained by using a GE Terminet (teleprinter) terminal in the production control office.

The system is working well and is being expanded to other areas, Sierra said. It's paying off in instant information for accurate recordkeeping and for doing the right work at the right time to meet customer schedules. It's definitely helping the business, through the more effective use of the basic resources of material, time and money, the firm added.

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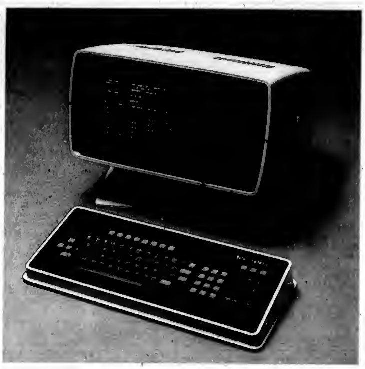

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Bits & Pieces

Calcomp OCP Joins Line Of Graphics Controllers

ANAHEIM, Calif. — California Computer Products, Inc. has added an on-line intelligent plotter controller (OPC) to its line of graphic controllers.

The OPC permits specified Calcomp plotters to be driven locally or remotely via a customer-supplied asynchronous modem. It converts computer output in standard RS-232C serial format and standard IEEE 488 parallel format into plotter commands, the firm said.

The controller costs $3,500 with deliveries starting in July from Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Optronics Introduces Pagitron Scanner

CHELMSFORD, Mass. — Optronics International, Inc. is offering a high-speed scanner called Pagitron for batch scanning of bank signature cards.

The signatures are stored in digital form on magnetic tape or disk and can be retrieved on a CRT for verification.

Up to 125 signatures can be scanned on a rotating drum in 2- to 3 min, according to the company.

The information in digitized form can be transmitted via telephone link or any other line for on-line access to centrally stored data by remote branches.

The unit costs $75,000 from Optronics International, 7 Stuart Rd., Chelmsford, Mass. 01824.

Documation Adds Impact Printer

MELBOURNE, Fla. — Documation, Inc. has introduced two impact line printer subsystems with a companion card processing subsystem.

The subsystem consists of either the DOC 2250 line printer (2,250 line/min) or the DOC 1800 (1,800 line/min). The companion card processing subsystem includes the DOC 6501 card reader and controller and the DOC 6520 card punch and controller, according to a spokesman.

The interface and the logic implemented in the Documation printer and card I/O subsystem allow it to appear to an IBM 360 or 370 as an IBM 3211 or 1403 line printer and a 2501 reader and 2520 punch, the firm said.

The DOC 2250 printer offers approximately double the throughput of an IBM 1403 and a higher throughput than the 3211, the spokesman claimed.

The buffered DOC 6501 reader eliminates systems halt due to channel overruns caused by unbuffered IBM 2501s, he reported. The DOC 6520 punch has an optional interpret (printing) feature that is not available with the IBM 2520 punch, he noted.

The DOC 2250/6501/6520 with the interpret feature costs $98,500. The DOC 1800/6501/6520 costs $92,000.

Configurations without the interpret option cost $2,000 less from the firm at P.O. Box 1240, Melbourne, Fla. 32901.

Fiche Reader Features COM Compatibility

ROCHESTER, N.Y. — A microfiche reader-printer that produces hard-copy prints and is compatible with computer-output microfilm (COM) is available from the Eastman Kodak Co.

There are nine optional interchangeable lenses from 17X to 48X magnification.

The basic configuration costs $2,700 and will be available in the fourth quarter, Kodak said from 343 State St., Rochester, N.Y. 14650.

To Join RJE, Batch Entry

Inforex Unveils 1330 Key-to-Disk System

By Frank Vaughan
Of the CW Staff

BURLINGTON, Mass. — In expanding its Series 1300 product line, Inforex, Inc. has added the 1330 key-disk system for users who wish to consolidate remote job entry (RJE) and batch data entry applications, the firm said.

An Inforex 1330 can consist of from one to 16 keystations, each with CRT display and keyboard, connected by cable to a control unit with disk files and a shared processor. A variety of additional peripheral devices, including 7- and 9-track tape drives, card readers and printers can be attached to the system.

The System 1330 offers twice the main memory of previous intelligent key entry systems on the Inforex 1300 series in order to support increased functionality, the firm claimed.

System Capabilities

The System 1330 provides three specialized libraries so that users can create, store and recall job stream formats, transmission parameters and Job Control Language (JCL) statements with a minimum number of keystrokes, according to a spokesman.

In addition, inquiries into job status and changes in job priorities can be made from the 1330 keystations when mainframe CPUs utilize spooling programs such as JES/RES, Hasp, Power/VS, Grasp or GRTS, he added.

The system provides for concurrent data entry and communications as well as emulation of 2770, 2780, 3770, 3780, 3741 and other remote batch/RJE equipment, he said.

Data compression and decompression by the 1330 will eliminate the transmission of redundant characters or blanks and reduce user communications costs, the spokesman claimed.

A message file on disk permits responses to job status inquiries and similar data to be stored and displayed at operator keystations, he said. The system will also spool "print images" to tape so that it can intercept unscheduled transmissions when the printer is busy and print the received information when the printer is no longer in use, he added.

Communications capabilities include Binary Synchronous Communications (BSC) at up to 9,600 bit/sec, an ability to transmit data to other BSC-oriented remote batch terminals and the ability to monitor and display the status of communications transfers in progress, he said.

System Components

The 1330 control unit consists of a 48K-byte minicomputer that utilizes an 8-bit word and contains all editing, arithmetic, validation, I/O and control software. The preprogrammed processor has a 1-microsec cycle time and is able to control up to 16 keystations.

The tape storage unit is contained in the control unit housing and is IBM, 7- or 9-track Ebcdic-compatible. It has 556-, 800- or 1,600 bit/in. storage density on a 45 in./sec 10.5-in. reel. Functions include tape-to-disk transfer, tape-to-printer and tape update while in place, he claimed.

The disk storage unit consists of 5M bytes of fixed storage and 5M bytes of removable storage for a 10M-byte capacity per drive. Up to four drives, a total of 40M bytes, can be used per control unit. Disk storage is allocated on demand, he noted.

The Model 2911 keystation performs editing and format control and has a CRT capable of displaying four 32-char. lines of information, he said.

A typical System 1330 configuration including four keystations, 10M bytes of disk storage, a tape drive and a 600 line/min printer leases for approximately $1,950/mo including maintenance on a three-year contract.

An entry-level system with two keystations and a 200 line/min printer costs $1,350/mo under a similar contract.

Deliveries of the 1330 will begin in the fourth quarter, the spokesman said from 21 North Ave., Burlington, Mass. 01803.

Avis Alters Reservation System To Accommodate Its Car Rentals

By Ann Dooley
Of the CW Staff

NEW YORK — Avis Rent-A-Car's Wizard system was customized from IBM's Passenger Airline Reservation System but "cars are different than the airline business — you don't have any control over the person driving," William Becker, director of Avis, Inc.'s technical services told a Computer Caravan audience here recently.

Wizard's development took 2-1/2 years. It cost International Telephone and Telegraph (ITT), which owned Avis when the system was first started in 1969, $32 million, Becker said.

The data development process included functional specifications — programming documentation, coding, unit and package testing and application systems tests, he explained.

Various field trials took place, a cutover reservation system was implemented, a first-city test was tried in Tulsa, Okla. (now the main center), cutover areas of the country were done and personnel were trained, Becker said.

Each step was frozen on completion with only minor changes occurring, he said.

ITT insisted on a careful analysis of what was really needed so nothing would have to be done over again, Becker said. There was also a deep corporate commitment about the project, he explained.

The goal was to develop an on-line real-time system including reservations, counter services, car control, data collection and message switching, Becker said. "We were going from a totally manual, pencil-pushing method to real-time, he added.

Defining Requirements

Much of the effort was in defining what was required. "It was the majority of the workload," Becker said.

"We came up with 70 base transactions for the terminal to do," he stated. "We also decided we would have problems with a totally dumb terminal so we went to a sort of intelligent terminal," he said.

"The system needed to print rental agreements with exact accuracy so we ended up with 1,300 customized terminals from Sanders Associates supporting a reservations center with 180 Sanders 720s communicating through regionalized Sandac 200s," he said. The mainframe is a 512K IBM 360/65, he added.

At the time, Sanders had an IBM Selectric-based terminal which is the "biggest hole in the system," he said. "It's a maintenance nightmare," there are so many little widgets that have to be repaired, he said. "That's why we're looking for new terminals."

The system includes 64 prompts from the prompt tube of the CRT for the operator and performs field-length editing, Becker said. All of the data is maintained at a central site, he explained.

"What started out like an airlines system turned out to be a front end for accounting to control the cash flow better," Becker said.

Assortment of Files

Data within the system consists of a motor vehicle access file including a description of the car, status, last mileage and other pertinent statistics.

A station record file includes an availability count, accounting data, gross vehicle count and cash control. A customer information records file includes reservation information, name, billing details, type of car rented, duration, driver's license number and other data.

A fourth file includes risk data detailing poor risk drivers and credit card users.

When a driver makes a reservation, he is put in the customer information file which connects him to the station file. As long as

(Continued on Page 31)

OCR Users Reduce Data Entry Costs

In an effort to reduce the costs of entering data into a system through a keyboard, some firms are examining the possibility of using optical character recognition (OCR) and specially designed forms. Two organizations, Westinghouse Credit Corp. and Erie County in New York State, have reported successes with this technology.

In December 1975, Westinghouse Credit installed an OCR system and developed seven forms to accompany the system. Using those forms, original source documents are generated at over 100 Westinghouse field locations. Information is typed onto the forms using an ordinary IBM Selectric typewriter with an OCR-A ball. After typing, the forms are mailed to the Westinghouse Credit data center in Pittsburgh.

Between 25,000 and 30,000 documents are scanned each month using a Laser OCR-One system by Optical Business Machines, Inc. of Melbourne, Fla. Since the implementation of the OCR system, Westinghouse has had a reduction in keypunch staff of over 50%, with a direct savings of $10,000 a month in personnel alone. Westinghouse also credits the OCR system with giving the firm the ability to expedite its financial reporting.

In Erie County, N.Y., OCR is being utilized in the county public health nursing system. The county formerly utilized mark sense for nursing activity reporting.

Since developing four forms to use with the Laser OCR-One system, Erie County has saved two to three hours per week per nurse. With 80 nurses, the county posts a weekly savings in excess of $5,000, or approximately $274,000 a year.

With the implementation of OCR technology, the DP department has faced a staff reduction of 15%, yet reported a 16% increase in efficiency in 1975 and an additional 10% in 1976.

OCR saves Erie County an estimated $300,000 annually, according to Gerald E. Wilson, director of DP for the county. He said the county is scanning approximately 20% of all documents.

Exploring DDP — Part 2

Decentralized Processing Has Advantages, Drawbacks

By Richard Weber
Special to Computerworld

From the DP manager's point of view, distributed data processing (DDP) increases his responsiveness to the various operating unit users. He can provide them with more options in terms of the precise functions to be handled.

For example, it is much easier to give the user a dedicated interactive system for transaction processing than it is to add this function to the mainframe.

It is less costly to implement an application on a minicomputer than a large mainframe. There is less systems overhead and what there is is much less complex.

More Flexibility

The decentralized approach also has much more flexibility. As applications grow or change, the network can be easily expanded with the addition of another small system. There is also less chance that one system's crash will bring down the entire DP organization.

But, most importantly, the DP manager will have a cooperative local operating unit manager, not a frustrated user.

What are the benefits for the line manager? He has a system dedicated to his requirements and tailored to his groups' objectives. He can get his application implemented much more quickly, with fewer bureaucratic problems. His system is responsive to his needs and gives him better system throughput and faster job turnaround.

Managerial Tools

The local manager now has his own performance tools that enhance control of daily operations and planning and that improve the productivity of his operations.

Lastly, from the corporate point of view, DDP increases the productivity of each operating unit. Accountability of each operating unit is easier, as is the application of performance criteria to the local operations.

The better local profit and loss management should result in increased overall profitability for the corporation.

It is possible to decentralize DP even within a centralized organization. The most popular distributed system — hierarchical, sometimes called centralized — attests to this.

The second distributed processing approach, totally decentralized, is just now beginning to be implemented.

The traditional hierarchical approach to DDP is characterized by a host mainframe which controls the entire network and continues to handle most data processing. The network exists primarily to transmit source data to the host processor.

Three Nodes

The typical hierarchy has three node levels. Node level 1 is the central site host. The functions performed here include network control, all program development for both management and operations support, system design, data base control, cost allocation, teleprocessing management and central purchasing.

At node level 2, minicomputers perform line concentrator and message-switching functions. They manage network facilities, monitor performance and execute alternate routing procedures. In addition, they sometimes contain small, frequently accessed data bases.

At node level 3, the lowest level, the nodes are intelligent terminal systems. Here, at the source data level, functions like data acquisition and validation, data base inquiry, limited processing and report production are carried out.

This is the second article in a three-part series on centralized vs. decentralized processing by Richard Weber, vice-president of sales for Data General Corp. The series is extracted from a presentation given at the 21st University of Alabama DP Conference, held earlier this year.

This week, Weber examines the structures and benefits of an organization with decentralized DP. Next week he will conclude the series with a discussion of the hardware, software and communications requirements of such an organization and look at two different approaches taken by firms who decentralized.

In some networks, node level 3 consists of nonintelligent terminals which handle only simple data or remote job entry functions.

Given the functions that are deployed down through the organization, the hierarchical system could be more accurately called a distributed data entry network.

Hierarchical networks are well suited to organizations that have strong centralized control, such as some financial institutions and insurance companies. The hierarchical approach easily aligns itself to the centralized corporate structure.

Control of the DP function remains with the DP manager, but the function becomes more streamlined and efficient than manual data transfer. The host is relieved of communications overhead, and line costs and error rates are lower.

One Disadvantage

The disadvantage is that the network is designed to support the host, and not the operational department users, although they may derive residual benefit from it. Only a small part of data processing is actually accomplished at the local level — usually just data entry validation, communications functions and perhaps some data base accessing and updating.

One major drawback of the hierarchical system is that there is still a great deal of dependence on the central site host, which may eventually become a victim of the centralization problems described earlier.

Functions Removed

In a totally decentralized system, all DP functions are removed from the central mainframe and split up among multiple minicomputers. Networks can be structured in a number of different ways.

In a "ring" network, each computer node controls its own function and all are equal — there is no dependence on a single machine. Each has similar hardware and software.

Usually, each computer can communicate with every other one and may have access to their files. Each node can back up any of the others.

At the other end of the decentralization concept is the loosely coupled network. There is very little or no communication between processing nodes. Rather, each is a stand-alone, self-sufficient unit.

Major Advantage

A major advantage of decentralized networks, then, is that there is no one structure to which users must adhere. Rather, DP can fit the procedures and operations of the business organization exactly. It does not force the business to conform to a DP facility.

Functions can be assigned using several different approaches:

- By operational departments within an organization. Each node handles a specifically defined corporate operation, such as accounting, sales, manufacturing, personnel.
- By division or subsidiary in a multidivisional corporation. Each division has profit and loss responsibility.
- By computing mode, like batch, time-sharing, interactive, communications or language.

The most popular assignment is the first, dedicating a computer node to a single operational department or activity. Each computer supports its own program development, data base and application programs.

Better Rationale

The rationale for decentralization is better response to particular operational needs. In summary, advantages include higher throughput, easy cost allocation, self-sufficiency, backup and, often, substantial financial savings over a leased mainframe as well as flexibility to alter DP units as the application or organization changes.

Essentially, decentralized DP means decentralizing the central site. In a ring configuration, the minicomputers are in close proximity, not dispersed. Each node handles all requirements of a defined operational application.

An additional "executive" node may handle data collection for management summaries, and another may be devoted to program development in order not to disturb active operations.

Two-Sided, Dual-Density Drive Added to Calcomp Line of Floppies

ANAHEIM, Calif. — California Computer Products, Inc. has introduced a two-sided, double-density floppy disk drive with an unformatted capacity of 12.8M bits and a microprocessor-driven controller with direct memory access (DMA) and RS-232C interface.

The Calcomp 143M floppy disk drive offers read/recovery capability and a flat head design, the firm said. The disk drive is interconnected to the multifunction controller, which was developed as a companion product, a spokesman noted.

The 143M permits user selection of up to four internal drive addresses and one of four independent head load addresses and includes a 50-pin interface to the system controller for a price of $785.

The 1143M controller reduces the requirements for host computer hardware and operating system software, Calcomp said.

It can control up to four Model 143Ms containing up to 16.4M bits of IBM 3740/3600-compatible formatted data.

An internal phase lock oscillator is included for data recovery along with an automatic drive status check and automatic error detection.

The unit costs $660 from Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

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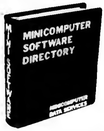

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Clothing Chain Controls Sales via Registers, Wands

TORONTO — In the fast moving business of retail sales, source data capture is the key to getting information to management in time to be useful. Thrifty's, a Canadian chain of casual clothing stores, is moving to keep abreast with the growing technology.

Thrifty's had severel reasons for considering source data capture. With close to 90 stores from coast to coast in Canada and a 25 store per year growth rate, the chain was becoming more difficult to manage. The management was also afraid of "losing touch" with the stores, and therefore losing some of the personality which is the strength of the chain.

During the day, all transactions that take place in the stores are punched into the Singer Model 909 cash register and stored on a Singer model 804 cassette tape unit. At the end of the day, the cash report is also punched in. That night, the computer phones each store and collects the sales data for about 30,000 transactions a day.

By morning, flash sales figures are available for on-line inquiry as well as detailed reports. Inventory information is updated, allowing under/over inventory checks for the day's distribution. With shipment times of up to two weeks to some of the stores, fast information is a necessity.

Thrifty's system runs on dual Data General Nova 2/10s with 64K bytes of core on each, two 80M-byte disk drives and a 300 line/min printer. Nine screens are scattered throughout the distribution center, with more to be added later. The system is being developed by Micom Computer Systems, Ltd. here.

Wave of a Wand

The system is not without its problems. With the large number of stores, high sales volume and seasonal and part-time labor, merchandise codes inevitably get punched incorrectly. To solve this problem, Thrifty's has started to install OCR-A wands in each of their stores.

The wands are hand-held ticket readers which plug into the store's cash registers. Tickets are the normal adhesive type, printed using a special typeset which is human readable. The class, style number and retail price are read in three passes of the ticket by the wand. The style number contains a check digit which is immediately verified by the cash register.

Checkout time has been improved using the wand, and customer and employee acceptance has been good. More important is the increased detail of information which is now collected; due to the volume, the time to enter style numbers manually would be prohibitive.

Accuracy of data collected has also been improved. As many as 10% of the codes punched in manually may have been incorrect, while the wands have, to date, made only four errors in more than 356,000 reads.

The wands will also allow more advanced applications. Information about weather and customers can be read in to produce store and customer profiles. Deliveries and shipments can be confirmed through the register. Inventory counts could even be punched through, with final results appearing at the head office the next day.

To further speed the movement of information, screens are placed where the information is happening: there is one in the receiving office, to immediately record incoming merchandise; one in the purchasing office, to control new orders; and various other screens located in the accounting and sales offices.

The system has a completely integrated data base, carrying on functions such as sales analysis, inventory control, purchasing, receiving, open-to-buy, markup and markdown control, physical inventory, accounts payable and general ledger. While reports and audit trails are printed, on-line inquiries are important, because of the immediacy of information required. The system produces several bar charts and histograms from the sales data collected.

Discourages Theft

By making the system as safeguarded as possible against accidental errors, it also guards against theft. The cash report, prepared and punched through by the store manager, must match the totals of the transactions as decoded by the computer. Since all transactions are prefixed by a sequence number, any missing transactions, including between one day and the next, are reported. Any sales for other than the correct price are also reported.

Any gift certificate or credit voucher issued is kept on file. When it is redeemed correctly, it is automatically removed; however, should they be redeemed for an amount different than issued, the difference is reported. A report can also be printed listing all outstanding vouchers and certificates by store.

The benefits also reach the stores directly. Each manager is given a detailed analysis of his sales on a regular basis, showing sales to date for the period and the year, comparing them with the same figures for last year.

Seminar on Project Management Slated for Chicago June 6-8

CHICAGO — A three-day seminar on "Project Management for Computer Systems" will be held here June 6-8 by the University of Chicago Center for Continuing Education.

The seminar will look at why project management is a necessity today, the effect of project management on DP organizations, contact with the user, the project cycle life, project workbooks, scheduling and estimating and the project as a profit-end-loss center. Some case studies will also be presented.

The course is intended for computer project managers, DP managers, vice-presidents of administration, financial managers and others involved in DP systems development and implementation.

Michael H. Marcus, president of SIC Systems, Inc., will lead the seminar, which will also be given in New York City Aug. 2-4. There is a $435 registration fee per person plus a $60 registration fee per company.

Registration can be completed by calling toll-free (800) 233-7450 or, in New York State, calling (212) 953-7266 collect.

All registrations will be confirmed by the University of Chicago Center for Continuing Education, 1307 E. 60th St., Chicago, Ill. 60637.

Documation Adds Print System

MELBOURNE, Fla. — Documation, Inc. has added a line printer capable of producing 2,000 line/min to its product line.

The DOC 2000 is microprocessor-controlled and uses a 48-character set with a fully buffered print line of 132 characters, the firm said. It can handle up to six-part forms, with forms ranging from 3- to 24 in. in length and 4- to 18.75 in. in width.

The printer has a slew rate of up to 75 in./sec, a spokesman claimed.

Standard Features

Other standard features include a powered forms stacker, insulated cover, interchangeahle character arrays and a universal character set buffer, the firm said.

Optional features include a powered hood and 144 print positions.

DOC 2000

The unit costs $36,000 in single quantities and $28,000 in OEM quantities, the firm said from P.O. Box 1240, Melbourne, Fla. 32901.

Avis Alters Reservation System

(Continued from Page 29)

he holds the car, he is in the motor vehicle file, and after he has returned the car, his information becomes an accounting item, Becker explained.

The Wizard of Avis file is an ongoing file used upon each repeated transaction by a driver. Information about drivers who hold this card doesn't have to be submitted at each transaction. Instead, the computer retrieves, validates and updates the driver's file, Becker said.

Only 3% of all transactions still come from nonautomated sites, according to Becker. The Avis employee, often a gas station attendant, calls in to a specified location and the informationis fed into the system over the phone, he said.

"Theoretically, we can backtrack the history of any car," he said. "We can determine who drove it, for how long and the total revenue derived from it," he said.

A 72-bit/sec line goes to Tulsa from New York City. Other sites are linked from city to city, to New York or directly to the city, he said.

Becker said the system justified the time and effort and cost that went into it and pointed out that "Avis, today, couldn't live without it."

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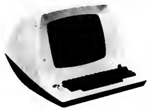

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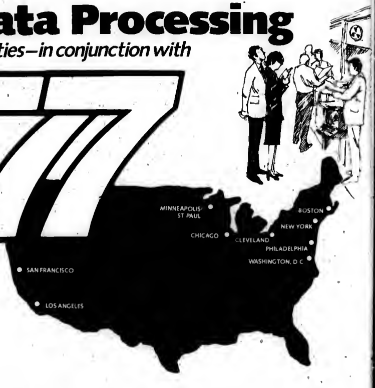

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Offers Interactive DP

Entry-Level I-8230 Expands NCR 8000

By Frank Vaughan
Of the CW Staff

DAYTON, Ohio — The NCR Corp. here has expanded its 8000 series with the I-8230, an entry-level system designed to provide conversational, interactive DP for smaller businesses.

The system is capable of executing up to five separate programs concurrently, an NCR spokesman said.

The basic I-8230 includes a 48K processor, 5 million bytes of disk storage, magnetic tape cassette, CRT and keyboard, a 55 line/min matrix printer and two additional communications channels for added CRTs.

Optional Features

Options include additional main memory up to 96K, a total disk capacity of 40 million bytes, up to 5 CRTs, line printers up to 600 line/min, flexible diskettes and magnetic tape handlers.

The I-8230 is the smallest system introduced to date in NCR's 8000 series. "It has basically the same engine as the I-8250," the spokesman said, "yet is generally a smaller version, with less main memory, less disk capacity and fewer I/O channels.

Peripherals announced as part of the I-8230 system can also be utilized on the larger I-8250. Included in the announcement was a fixed-media disk unit with either 4.9- or 9.8 million byte capacity.

A second disk unit offering 4.9 million bytes of memory in the form of one fixed and one removable platter is also available, according to the spokesman.

Line printers include both 200- and 300 line/min band printers plus 70- and 125 line/min matrix printers.

Multichannel Adapter

An additional enhancement to the I-8200 family of systems is a multichannel communications adapter which provides communications to three CRTs, replacing the more expensive individual CRT adapters, NCR said.

Additionally, NCR announced a memory price reduction on the previously released I-8250. As an example, the 16K of memory required to expand a basic 48K system to 64K has been reduced from $110- to $70/mo rental, the spokesman said.

The basic I-8230 costs $28,600 and rents for $855/mo. The fixed-media disk in the 4.9 million byte configuration sells for $4,000 and rents for $130/mo; the 9.8 million byte unit sells for $5,000 and rents for $150. The fixed/removable platter unit rents for $280/mo and sells for $9,500.

The disk units will be available in January, the spokesman said.

The 200- and 300 line/min band printers have a monthly rental fee of $395 and $475 respectively. Purchase prices are $13,500 and $16,000.

The 70- and 125 line/min matrix printers rent for $235- and $310/mo, including attachments. Purchase prices are $7,500 and $10,800.

The multichannel communications adapter sells for $1,010 and rents for $70/mo.

NCR Corp. I-8230

Available applications include the Interactive Health Care Information System, the Interactive Manufacturing System, the Interactive Wholesale/Distribution System, the Interactive Moving and Storage System, Scholars (for schools), the Interactive Financial Management System and the Interactive General Accounting System.

DG Machines Provide Ansi '74 Cobol

WESTBORO, Mass. — An interactive Cobol-based small business system designed to suit the needs of operational departments of Fortune 2,000 companies has been unveiled by Data General Corp.

The CS/40, available in three models, supports up to nine CRT stations and is based on a customized version of the firm's Nova 3/12 minicomputer. With this introduction, DG effectively brings Ansi '74 Cobol to the users of its small systems, according to a spokesman.

Users with Nova 3/12 configurations can upgrade to the first model of the CS/40 for $5,500 in software costs. Hardware costs vary according to the 3/12 configuration, the spokesman said. Additional copies of the software cost $3,500.

The Cobol on the CS/40 is not identical to that available on the firm's Eclipse systems, he noted. The CS/40 Cobol represents Ansi '74 implemented at Level 1 with some extensions to Level 2 while the Eclipse Cobol is full Ansi '74 Level 2, DG said.

The CS/40 can be programmed by Cobol programmers without special minicomputer training, DG claimed, and can, with some modification, use the base of application programs already developed in this language.

The CS/40 is comparable to the IBM System 34, Burroughs Corp. B80, NCR 8200 and small business systems from Basic/Four Corp. and Digital Equipment Corp., the spokesman added. It will be offered to OEMs for configuring turnkey systems for first-time users.

The three models — Mod C1, Mod C3 and Mod C5 — are software-compatible. The interactive Cobol programs operate under the CS/40 operating system adapted from DG's RTDOS operating system.

The models can be upgraded within the line in the field through the use of an upgrade kit, the firm said.

(Continued on Page 34)

Profitability Called Main Reason to Get Mini

By Esther Surden
Of the CW Staff

NEW HAVEN, Conn. — "There's only one reason to change from the way you are presently doing business — and that is to make more profit," David W. Chaffin, president of Applied Data Processing, told a group at the Northeastern Conference (Necon '77) held here recently by the Data Processing Management Association.

Describing points users should check before buying a minicomputer system, Chaffin suggested that users list all the major systems in their organizations and make estimates of the profit improvement that could be expected by changing the way of doing a particular operation. Users should then rank the major systems in sequence, indicating the most to the least potential profit improvement, he recommended.

Not Just Cost Cuts

Profit improvement involves not only cost reduction, but profitable revenue, reduced unprofitable revenue, reduced receivables and inventory investment to produce lower costs, better quality and fast delivery, he said.

The user should ask, "What's the least costly computer necessary to achieve my major profit improvements?" and "What's the maximum profit improvement I can expect to achieve?" If the maximum profit improvement doesn't justify the least costly computer, then forget a computer, he said.

CW at
Necon '77

Hard to Measure

Although throughput on mainframes is relatively easy to define, minis are much more difficult to measure. Two important aspects of mini performance are the rate of disk access and the number of disk accesses required to perform a given transaction.

While the hardware specifications limit the rate of disk access, it is the operating system and the application software that dictate the number of disk accesses per transaction. Two pieces of hardware that are identical in every way can have different capacities depending on the operating system and application software selected, he warned.

In order to find out the true capacities of an operating system, Chaffin said potential users should ask each vendor to compare

(Continued on Page 34)

What's Your Story?

Ah, the wild, wonderful world of minicomputers . . . What user doesn't have a story to tell?

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Maybe it's been down since the day you got it or maybe it runs as smoothly as a well-oiled machine.

Do you have a used mini? Does your staff maintain the system? Or maybe you wish it could because you've had a bad experience with vendor maintenance?

We're interested. CW's special report in August will concentrate on your experiences with minicomputers.

So tell us your story. Just double-space it, make it four or five pages long and send it by July 11 to Esther Surden, Associate Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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CS/40 From DG Offered in Three Models

(Continued from Page 33)

The models share a Cobol screen management facility that enables the creation of menu-driven displays and "fill-in-the-blank" formatting. The system supports sequential, relative and indexed sequential files with the C3 and C5 including a lockout feature which prevents more than one operator from accessing the same record simultaneously.

The Mod 1 and Mod 3 use disk-swapping techniques while the larger model, the Mod 5, uses memory management, which is better suited to heavy interactive use, the spokesman explained.

For distributed applications, the CS/40 can optionally support synchronous communications with other CS/40 systems, larger DG systems or IBM-compatible host installations. Batch communications are facilitated through DG's RJE-80 using IBM 3780/2780 protocols, the company stated.

The CS/40 also supports DG and IBM magnetic tape formats for tape file transfers to other systems or to the host.

A basic Mod C1 includes a 64K CPU, 10M bytes of disk cartridge and a Dasher CRT. Either a 60 char./sec Dasher printer, 165 char./sec serial printer or a 300 line/min printer can be added to the system, which can accommodate up to 40M bytes of storage. The C1 can also include a floppy disk drive or magnetic tape unit.

The Mod C3 with the same basic hardware configuration can accommodate up to four CRTs. The Mod C5, which can accommodate either 128K or 192K bytes of memory, can be equipped with up to nine CRTs.

A single-user system with 64K bytes of memory, 10M bytes of disk, single diskette drive and 60 char./sec terminal printer in a single bay cabinet costs $33,415.

A typical Mod C3 system with three CRT workstations, 64K bytes of MOS memory, 10M bytes of disk, diskette drive, 60 char./sec teleprinter and a single bay cabinet costs $40,245 including the Cobol and system utilities.

A large Mod 5 system with five CRT workstations, 128K bytes of MOS memory with parity, 20M bytes of disk, magnetic tape, 300 line/min printer, synchronous communications options and a two-bay cabinet costs $82,100.

Boosting Profits Seen Top Reason For Getting Mini

(Continued from Page 33)

his operating system with those of other vendors. Although most vendors try not to knock the product of their rivals, they will not be reluctant to do so if invited and "you'll learn a lot," he suggested.

Software specifications should be thoroughly defined, he warned. "Specs are to software as a blueprint is to a house," he said.

Although custom software seems like a good idea to many people, there's something wrong with a system that can't be seen or tested until it is received, he observed.

Good packaged software is not only available, he said, but any package from a reliable firm will have a host of options to meet the needs of a wide variety of organizations. And users should expect that bugs will develop, even with software from a reliable firm. "A reliable firm will correct the bugs," he noted.

All the Places

Because a system is hardly valuable when it is down, Chaffin suggested that users get a list of all the installations of a particular vendor within a certain geographical area. Vendors may be reluctant to provide such a list, but users can tell the vendor they won't do business with him until his references can be checked at random.

When checking references, users should be sure to ask at least one last question after all the prepared questions are answered. That question is, "Can you think of anything else I ought to know about this particular vendor or the equipment?" The answers provided could be surprising, he said.

A user should insist that everything that is important to him is in the contract, he added. "You can be sure that everything that is important to the vendor will be in it. I don't believe in verbal promises. They stink," he said.

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Mini Helps Measure Medical Benefits of Exercise

N. DALLAS, Texas — A minicomputer at the Aerobics Activity Center here is proving that bending down to pick up IBM cards spewed onto the floor as a result of a malfunctioning card reader is not the true meaning of "regular exercise."

The Aerobics Activity Center, working in conjunction with the nearby Institute for Aerobics Research, is primarily concerned with establishing the extent to which regular exercise can reduce or eliminate the incidence of heart attack, high blood pressure and other cardiovascular risks, according to Bill Walker, executive director of the institute.

The results of the study are being drawn from the medical histories of the nearly 10,000 people participating in the program.

Initially, each of the program participants is given a physical examination at the Cooper Clinic in Dallas. These individuals are then asked to furnish the research institute with detailed records of their exercise activities.

The records are regularly reviewed by the institute to compare the initial physical condition of an individual with the effect of exercise over a defined period of time. Study results and participant records are maintained in a history file, Walker said.

The records for the system are maintained on a Datapoint Corp. Datashare system using a 5500 CPU with 48K of memory, seven CRTs, four 25M-byte disk drives and a 600 line/min printer.

Five of the CRTs are hard-wired while two are connected via dedicated telephone lines between the activities center and the institute, according to Steve White, systems analyst.

The activity center terminals are used primarily for entry of data related to participant exercise activities. The terminal units at the research institute are used to process medical history data and information from an "exercise log" supplied by the program participants, White explained.

The primary system application is aimed at organization and reduction of the program data base. Units are also used to monitor research being conducted on a much smaller and more strictly controlled group of exercises, he said.

In addition, the system provides an index of correspondence from which institute documents and letters may be easily retrieved.

Most of the data entry activity for this program is handled by clerks working from source documents, Walker said. However, at least 700 local participants weekly use the terminal units for entry of exercise information.

This information may include such things as type of exercise being engaged in, description of the exercise routine and time period of the exercise.

In-House Programming

The Datapoint system is programmed in Datashare (designed especially for multiuser applications) as well as RPG II, Basic and even Assembly language, White said.

The research institute also makes substantial use of the system's Partition Supervisor. This special software package permits batch processing or communications to be performed while Datashare operations proceed uninterrupted.

The system maintains three basic files for each participant in the study, according to White.

The first file contains the individual's name and address, date of birth and age.

The second file contains basic medical information, obtained from the initial comprehensive physical examination, about the program participant.

The third file includes all the exercise data accumulated for each of the individuals involved in the program. Each of the three file categories is assigned a unique seven-digit identification code during data entry, White said.

Detailed Recordkeeping

The institute's long-range research program is built on medical examination records maintained at the activity center, detailed "logs" of exercise information and data from subsequent medical examinations, White continued.

Statistical analysis of these records is extremely important to the research study and is the responsibility of the institute's staff epidemiologist, Dr. Betty Myers, according to White.

Her task is to assess the causal and noncausal relationships which exist between the incidence of heart-related diseases and the lack of regularly conducted exercise programs, he explained.

Prior to the installation of the Datapoint system, research tasks at the institute were conducted using in-house keypunch machines and computer time purchased (at bargain rates) from a local nonprofit organization, Walker indicated.

On occasion the DP department connects the Datapoint system to an IBM 370/165 at the North Texas Regional Computer Center to do some statistical analysis, but the system is primarily a stand-alone unit, White noted.

Firm's IBM 3 Raises Billing Volume 400%

BIRMINGHAM, Ala. — An IBM-based service bureau for the medical industry here has increased business volume about 400% in its four years of operation, according to Dr. James Ballard, president.

The firm, which supplies specialized billing and accounting services to radiologists, anesthesiologists, pathologists and emergency room physicians, has an IBM 3/15.

The configuration includes 96K of memory, a multifunction card unit using 96-column cards, a 1,100 line/min printer, tape drives, 3340 disk drives and a 3741 direct attach terminal.

Data entry is via diskette using 3741s and 3742s in remote locations, Ballard noted.

Data Edits

Data edits are performed to eliminate errors. The remaining data updates statistical files. File maintenance is then performed and errors are transmitted back to the client for corrections, Ballard explained.

Throughout processing full-spool support is used. Transaction processing is performed on 3340 disk with daily backup on the 3410 tape units, he noted.

If the user wants, the company offers reporting on microfiche using a local computer-output microfilm center.

The firm plans to offer billing and accounting service to professional medical groups. Each association will be offered customized billing or a total accounting system.

CO:77 display terminal is a compact, lightweight CRT display with multiple keyboard layouts and three screen sizes. It features non-glare screens that tilt for the most comfortable viewing angle, n-key rollover and a 60-cycle refresh rate.

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Military Mini Gets Cache Unit

NORWALK, Conn. — A cache memory enhancement for its militarized PDP-11/34M minicomputer has been introduced by the Norden Division of United Technologies.

The Norden PDP-11/34M is compatible with Digital Equipment Corp.'s PDP-11/34, according to a spokesman.

The cache enhancement is a high-speed bipolar memory which allows access to 1,000 words of the PDP-11/34M main memory. It is available in the full Air Transport Rack version of the system.

The enhancement can increase throughput up to 100%, Norden claimed, with its 250 nsec cycle time and byte parity. It is transparent to the programmer, the spokesman added.

The cache unit features registers for maintenance mode and is contained on one plug-in double module, Norden said.

The basic mini system costs $18,500; the cache enhancement can be added for $2,800. Norden is in Norwalk, Conn. 06856.

Based on HP Equipment

Turnkey Handles Multilocation Inventory

LONG BEACH, Calif.— Data Systems for Industry here has a minicomputer-based turnkey system for inventory control and replenishment.

Based on Hewlett-Packard Co. equipment, the system provides stocking-level maintenance at multiple locations, the firm said.

Centralized warehousing and requirements planning, cost distribution, purchase control, and purchase order preparation are all provided by the system, according to a spokesman.

Data entry is via on-line CRTs, the company added.

Handles 12,000 Items

A basic system handles up to 12,000 inventory items with an average 1 sec response time for transactions and inquiries, the firm claimed. Additional disk storage is needed to handle the maximum of 38,000 inventory items or 94,000 item locations, the spokesman noted.

The basic system includes a 32K-word CPU, 15M-byte disk drive, 60 line/min printer and two CRT terminals. Up to 10 terminals can be attached in a single-processor version and up to 24 terminals in a dual-processor version, the company stated.

A basic system including software costs $75,000 and leases for $1,500/mo. A dual-processor version with 30M bytes of disk, a 300 line/min printer, 1,600 bit/in. magnetic tape unit and 18 terminals costs $170,000 or $3,400/mo to lease.

Remote job entry capability can be added for $10,000, the spokesman said from 3450 E. Spring St., Long Beach, Calif. 90806.

Viuram-8 Links PDP-8 With CRT

OAKLAND, Calif. — The Video Interface Unit Random-Access Memory (Viuram) from Computer Technology is a CRT interface for the Digital Equipment Corp. PDP-8 minicomputer that fits on a single board and plugs directly into the mini's backplane, the firm said.

The display memory occupies part of the CPU's memory address space and is directly accessible by the DEC system, just like any other section of the memory, according to the firm.

Works With Standard CRT

Only a standard CRT must be connected to the unit to have a user-programmable display, the vendor claimed. With a keyboard, the unit and CRT can act as an interactive terminal.

The system allows the full intelligence of the minicomputer to be used to format and update the display, a spokesman said. Custom character sets or several standard sets are available.

The Viuram-8 costs $765; a keyboard interface costs $70; a video monitor is $200 and a keyboard costs $100.

A model is available for the LSI-11 micro as well, the firm noted from 6043 Lawton Ave., Oakland, Calif. 94618.

Terminal at Heart Of Business Turnkey

CINCINNATI — Integrity Systems, Inc. has a general business DP turnkey system based on an intelligent terminal.

The system, which uses an Incoterm Corp. intelligent terminal with 4K of programmable memory, performs accounts payable, accounts receivable, inventory control and general ledger.

A contractor's package with payroll, job costing and scheduling is also available.

A 330 char./sec printer is used for report and check printing, a spokesman said.

A turnkey system with an hourly or salary payroll program, labor cost distribution program, accounts payable and receivable, job cost distribution, general ledger and inventory costs $25,000 for both hardware and software.

The firm is at 11633-3 Timber Ridge Lane, Cincinnati, Ohio 45241.

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CI Notes

Shareholders Suit Charges Amdahl With SEC Violation

SUNNYVALE, Calif. — Three shareholders have filed an $8 million suit against Amdahl Corp. in a federal court in Philadelphia, charging violation of Securities and Exchange Commission (SEC) federal disclosure requirements in connection with the firm's initial public offering of one million shares last August.

The suit alleges Amdahl failed to disclose that certain major holders of unregistered Amdahl stock had the right to compel Amdahl to register their shares after the initial public sale.

The suit maintained those rights should have been disclosed in Amdahl's original prospectus and stated subsequent disclosure of the rights of the major stockholders has damaged the plaintiffs by depressing the price of Amdahl's stock.

The suit identified the major shareholders as Heizer Corp., a German firm, Fujitsu Ltd. and Nixdorf Computer, Inc.

Nixdorf has already announced plans to sell its 300,000 shares of stock, about 5% of the firm, through an Amdahl secondary public offering currently in registration.

Eugene R. White, Amdahl president, said he believes the company's August 1976 prospectus was in full compliance with SEC laws. Amdahl believes the suit is without merit and intends to defend it vigorously, he added.

MCS Forms Peripherals Division

ANAHEIM, Calif. — Mini-Computer Systems (MCS) has formed a Peripheral Products Division to market MCS standalone peripheral products.

This new division includes the products previously produced and marketed by Media III, MCS Designs and MCS Info Devices.

"By combining these operations, we can offer our customers unique opportunities to put together cost-effective packages," according to Art Garofalo, division general manager.

"As an example, we design our line of Deskware computer furniture so customers can literally specify any type of workstation or system to complement the hardware.

"In fact, we are the only supplier who has developed a full line of furniture that is integrated with its own peripherals," Garofalo said.

Founder of STC Charges

PCM Start-Ups Couldn't Make It Today

By Catherine Arnst
Of the CW Staff

NEW YORK — It wouldn't "make any sense" to start a new IBM plug-compatible tape drive company today because it would be considered too vulnerable by potential investors, Jesse Aweida, founder of Storage Technology Corp. (STC), testified at the U.S. vs. IBM antitrust trial recently.

That vulnerability stems from such a plug-compatible manufacturer's (PCM) dependence on IBM price and product actions — a vulnerability "you can't do anything about," Aweida said.

The financial community sees the plug-compatible tape drive market as too risky and bases that assumption partially on the fact that, of the eight companies in that area in 1970, only two are left — STC and IBM, he said.

IBM was considered plug-compatible in this context because its tape drives were "plug-compatible" with its CPUs.

Aweida, a former IBM engineer, along with three other IBM employees founded STC in 1969 because he perceived an opportunity "to make a lot of money." Although STC has been successful, he warned "the approach we took would not work today."

STC's approach was to finance its operations as it went along, but today a company would need all the capital necessary to finance the development, manufacturing and marketing of its product before it began, he said.

"It's too risky to assume you could get more financing at a later date," Aweida testified, adding a minimum of $5 million would be needed today to start such a venture.

In addition, since IBM releases very little information on its products, to develop an IBM plug-compatible tape drive from scratch would require 14 to 24 months (after acquiring the IBM product), 60 to 80 people and a cost of between $5 million and $8 million, he said.

STC announced its first plug-compatible tape drive, the 2470, in April 1970 as a replacement for the IBM 2420 Model 7. The IBM 2420 series, meant for IBM 360 and 370 CPUs, was introduced in 1969 with a high-price umbrella because "PCM competition . . . was not viewed as a threat serious enough to alter IBM's growth in the market," an IBM trial document said.

STC's tape drives were priced 10% to 20% lower than the comparable IBM tape drive to get the volume of sales wanted.

He considered STC's drives "more advanced" than IBM's in terms of customer interface, ease of use, method of recording and data transfer rates.

In November 1970, IBM offered the 3420 Model 7 tape drive, which had identical capabilities to the 2420 Model 7, but with a 30% lower price, Aweida said.

There were some technological changes in the 3420, including an interface change between the drive and the controller, but these changes had no effect on the performance.

Price Cuts

Within 60 days of IBM's announcement, STC reduced prices on its 2470, although that was 11 months prior to IBM's first customer shipment. If the peripheral manufacturer had not made the cut right away, customers would have waited for the IBM equipment, Aweida said.

This price cut, along with IBM's fixed-term lease plan (announced May 1971) had a negative effect on STC's ability to obtain financing, Aweida testified.

A public offering of stock in June 1971 resulted in prices "lower than what we thought we could get."

In order to raise more capital, STC decided to increase the sales portion of its sales/lease ratio. It had been selling about 30% and leasing 70% of its equipment, but it wanted to raise the sales portion to at least 40%, although that action would reduce its earnings over the long term, Aweida said.

STC continued to have problems raising money, however. The interest on bank loans it obtained was 3% higher than average and it resorted to selling convertible debentures rather than obtaining straight debts.

"The financial community was very, very cool about peripheral companies competing with IBM," Aweida said.

STC also suffered a drop in its stock prices in March 1973, when IBM announced its 3420 models 4, 6 and 8, with a recording density of 6,250 bit/in.

STC's stock had been selling at an average of 25-3/8 during the first quarter of 1973 and dropped to an average of 17 during the second quarter.

Users Cite Poor Service as Cause For Switching to Small Computers

By Toni Wiseman
Of the CW Staff

MENLO PARK, Calif. — Most users initially consider switching from a service bureau to a small business computer as a result of an experience involving poor service, according to a recent report by Input, a market research firm.

"Lower 'cost' and increased 'control' are the recurrent reasons given by those new small business computer users who defected from processing services," the report noted.

Large services vendors who cater to larger users are not unduly concerned about competition from small business computers, whereas smaller vendors who depend on users with budgets of $1,000 to $2,000 per month view the small business computer as a threat, the report indicated.

Processing services vendors reported that from .5% to 12% of a year's lost revenues are lost to small business computer systems purchased by their existing users, Input found.

Input concluded that the service bureau customer most likely to convert to a small business computer is doing primarily accounting applications, has a single specialized application, is using outdated software and is complaining about poor service.

The study noted several vendors with a large base of batch-oriented users are also distributing small business computers, such as ADP, which offers Microdata's Reality, and Computer Task Group, Inc. and NLT Computer Corp., which act as distributors for Basic/Four.

"The marketing of a small business computer by a processing services vendor is not related to the size of the vendor or the type of services offered, but rather to its management of the attitude about offering a complete range of solution options to its clients and the perception by its management of its vulnerability to small business computer competition," the study stated.

Input estimated the small business computer market at more than $1.5 billion in 1976, a total divided among some 30 vendors. Shipments, it added, should grow at

(Continued on Page 38)

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Custom Software Firms Find

In-House Training Programs Help Cut Staff Turnover

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. — Some custom software firms have found one way to reduce employee turnover: in-house training programs, according to speakers at a session on the future of the custom software business at the recent Association of Data Processing Service Organizations (Adapso) conference here.

Amidst projections of growth of the custom software business in both the government and commercial sectors and explanations of how diverse the custom software business is, attendees and speakers alike grappled with the problem germane to their business: how to obtain and keep quality technical people.

Several of the speakers indicated their firms had experienced a reduction in employee turnover after instituting in-house training programs.

Information Sciences Co., which contracts with the federal government, now has programs on project management, contract management and marketing as well as other areas, according to President Thiel Sullivan.

The reduced turnover has probably offset the investment in the training materials, he said. Of about 1,400 employees, the firm trains about 400 each year.

One of the problems in custom software is the high turnover resulting from raiding by other firms, the fact that good people are very marketable and the difficulty in illustrating that there is a career path.

AGS Computers, Inc. runs a large internal education program and also tries to train people by getting the right kind of assignments and spreading these through the company, according to President Larry Schoenberg.

The firm has taken steps to put its production people on an incentive plan, he said.

Programmers are a party to the contract and share in the profit.

This "puts them on the same wavelength" as management and its concern with profitability, he said. "I think the programmers work longer hours," he remarked.

A major problem is keeping people on a particular job for a long time, Schoenberg said. "We deal openly with it and offer them a bonus" for certain lengths of service on one job.

"This means we appreciate their staying and understand they may be losing the opportunity to update their skills," he added.

Day of Bounty Hunter

The day of the bounty hunter is here. AGS pays its own employees $1,000 for recruiting needed individuals.

Generally, the costs for recruiting are about $3,000 to $5,000 a person, according to estimates.

"There is a greater shortage of programmers now than in the past," Schoenberg said.

IBM no longer trains people free of charge, and banks and insurance companies have reduced their training programs accordingly, he said.

The skill areas in high demand now are RSTS, the operating system on the Digital Equipment Corp. PDP-11, and IMS on IBM machines, he added.

Bad Service Leads Users to Switch To Small Systems

(Continued from Page 37)

about 20% to 25% annually.

"Hardware differentiation is diminishing as companies purchase peripheral equipment on an OEM basis to be incorporated into their systems," the study said. "As hardware prices drop, manufacturers place more emphasis on software, both systems and applications."

The move towards emphasizing software has been accompanied by a trend of small systems and software houses providing turnkey installations, acting as a manufacturer's distributor.

The small business computer manufacturer is prospering at the expense of the service bureau: 35% of new business is from batch services defectors; 30% of new business is from first-time DP users who went directly to an in-house small business system rather than to a service bureau.

"A continued gain in the price/performance of small business computers, which is anticipated to improve by a factor of 1.6 between 1976 and 1980, will result from continued decreases in semiconductor main memory costs, continued price/performance improvements in computer on a chip technology and accessibility and flexibility, especially when compared to batch services," the report predicted.

Input is located at 2180 Sand Hill Rd., Suite 320, Menlo Park, Calif. 94025.

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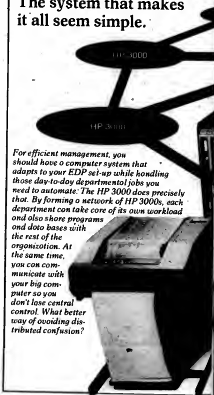

For efficient management, you should have a computer system that adapts to your EDP set-up while handling those day-to-day departmental jobs you need to automate: The HP 3000 does precisely that. By forming a network of HP 3000s, each department can take care of its own workload and also share programs and data bases with the rest of the organization. At the same time, you can communicate with your big computer so you don't lose central control. What better way of avoiding distributed confusion?

47703HPG5

CDI Pursuing TI for Bigger Share of Terminals Mart

By Toni Wiseman
Of the CW Staff

BURLINGTON, Mass. — The pursuit of the "giants" by the "little guys" has been a time-honored practice in the computer industry, a tradition Computer Devices, Inc. (CDI) is upholding in its battle with Texas Instruments in the compact terminals marketplace.

TI is a definite first with 55% to 65% of the market, but CDI is a "strong second" with 25%, according to Kermit L. Stofer, executive vice-president. Stofer noted that the remaining market share is split into very small segments held by firms such as NCR and Computer Transceiver Systems, Inc.

CDI has evolved from a one-product company six years ago to a multiproduct, end-user/OEM firm today. President Kendall Wright based his marketing philosophy on the premise that he couldn't and wouldn't compete with TI on a price basis, but rather would emphasize the quality, quietness and reliability of his products.

Wright acknowledges that not everyone is interested in these features — that some users are satisfied with a "quick and dirty" terminal — but there are enough users looking for quality products to have pushed CDI from $500,000 in sales in 1972 to $10 million this year.

Lease Strategy

When the company began in 1971, it had a single product, the Model 1030, which incorporated an NCR printing mechanism. Since this represented 50% of the manufacturing costs, CDI decided to broaden its product line and produce its own printer.

The result? The Model Q3 thermal printer. The Q3 is the heart of CDI's Miniterm series that runs from the 1201 receive-only terminal up through the 1204 automatic send/receive (ASR) terminal, with future additions planned, Stofer said.

CDI currently has about 3,000 customers with 8,000 units in the field — a number Stofer expects to grow to 10,000 by the end of 1977.

Of the equipment, 50% to 75% is out on one-year leases, a "strategy set by IBM," Stofer noted, adding that one of CDI's main strengths has been its ability to set up the lease base without any third-party intervention. "It's hard for a small company to get over the financial hump to a lease base," he said.

OEM Operation

Last year CDI set up an OEM operation, primarily to market the Q3 printer mechanism. Stofer sees CDI's primary markets as medical instrumentation houses, data logging devices and test stations, "where there is a critical need for compactness and quietness."

OEM sales account for about 10% of total revenues, but Stofer expects the percentage to climb to 25% to 30% in the next year and a half. International sales are running about 15% of total business and should develop to 25% eventually, he predicted.

CDI has traditionally blanketed TI product for product: the CDI 1202 for the TI 743, the CDI 1203 for the TI 745 and so on.

"But we've always tried to be a little innovative," Stofer said. "We pioneered portable APL terminals, wide (132-column) carriage terminals and portable ASR units." He noted that Computer Transceiver was actually the first with portable units of any type.

With the 1204, CDI is launching itself into an entirely new area, he indicated. "This is the first portable ASR terminal compacted with an 8K random-access memory and 68,000-character minicassette unit.

"The theory is that it is a whole lot easier to do your editing in memory before transmitting. The editing power is the 1204's main distinctive feature over other ASR units," he said.

This is also the first time a terminal will be cost-justifiable for the user, he stated, since the unit rents for $165/mo and the user can average monthly savings of $300 to $400 on connect time in a normal time-sharing environment.

The Race Is On

"This market is beginning to be a two-man race. TI is huge and has tremendous resources, so its strategy revolves around price and volume. It constantly has been a price leader in all industries it markets in — calculators, semis and terminals," Stofer stated.

"So CDI has to be a price follower. This means our strategy across the board has been a consistently higher price than TI but also a superior product; we sell features, quality and reliability," he added.

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So if you want to take the confusion out of distributed processing, now and in the years ahead, call your nearest Hewlett-Packard office listed in the White Pages. Ask for a Computer Systems representative. Or write for more information to Bill Krause, Hewlett-Packard, 11000 Wolfe Road, Dept. 304, Cupertino CA 95014.

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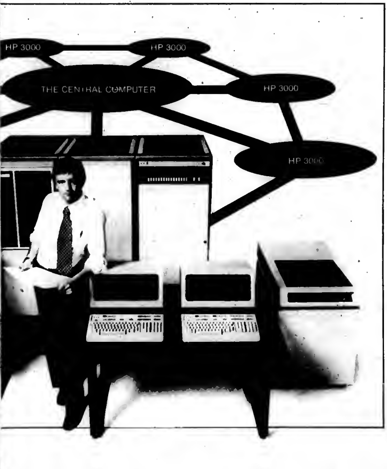

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$100 Million Annually

Wide Market for Personal DP Emerging

By Toni Wiseman
Of the CW Staff

NEW YORK — Personal computing products will span the range from high-end programmable video games to powerful desktop computers for professional use.

And, with product prices in the $300 to $2,000 range and an annual market estimated at $100 million, the implications of the emerging market are significant for both users and suppliers, according to a paper presented by Robert F. Wickham of Vantage Research, Inc. at a recent conference here.

At its current growth rate, the hobby market, which did not exist until 1974, should exceed $100 million in 1977, Wickham said.

Today, there are over 20,000 hobby computers in use or under construction, over 350 retail stores in the U.S., Canada, Japan and Europe and an estimated 100,000 active computer hobbyists.

Major Driving Force

"The hobby computer market is the major driving force in the development of the personal computer market at the present time," he noted. "As an effective bridge between the professional user — where the hardware and software expertise exists — and the consumer or hobby user — where the new applications and hroad base of users are located, the hobby market is at the forefront of product and applications development.

"The size and growth of the hobby market is attracting creative talent and investment capital, the two key ingredients in any major new market," Wickham stated.

"At the $100 million sales level, the market has caught the attention of both the consumer-oriented equipment manufacturers and the traditional suppliers of calculators and small computer systems," he said.

Video Games

Programmable video games will make their appearance this year, Wickham said. These will be sophisticated microprocessor-based games selling for $150 to $200.

"From the standpoint of the development of the personal computer market, perhaps the greatest contribution of the video games market will be the introduction of millions of people to the use of small computer-based systems in the home," he said.

The rapid acceptance of consumer calculators vividly demonstrated the latent need for personalized computational devices, Wickham suggested. However, at the professional level, the $10,000 price tag has limited the success of personal computers, which require a specialized sales force, software support and full factory maintenance support.

"As a result, the suppliers of these professional-oriented personal computers are faced with a dilemma. At current price levels, a large part of the personal computer market is not open to them, but at lower prices it is difficult to generate the margins to support the required sales and maintenance forces," Wickham observed.

The Typical Hobbyist

NEW YORK — "The typical personal computing enthusiast is a well-educated, upper middle class male with a professional interest in technology."

That summary is the result of a survey conducted by *Byte Magazine* of its subscribers, according to Carl T. Helmers Jr., editor-in-chief.

Of 1,448 respondents, 99% were male; their median income was $20,000, although 19% had incomes of $30,000 or more; and 74% had college degrees (33% had advanced degrees.)

Uses of personal computers were split into two categories: hobby or home applications and professional or business applications. In the hobby area, computers were used for software development, interactive keyboard games, graphics, real-time control (such as in household automation) and personal data bases.

In professional applications, mathematical or data analysis, simulation, professional data bases and text processing were the primary uses.

Byte also found the majority of hobbyists decided to pursue personal uses of computers based on some prior involvement in the fields of software or hardware design.

Twenty-eight percent of the respondents had less than two years' experience in both hardware and software design, while 43% had less than two years' experience in one area and 22% had more than two years' experience in both categories.

In addition, 51% of those responding had experience working with large computers, 59% with minicomputers, 23% with a Motorola 6800 and 42% with an Intel 8080.

Pertec Forms Data Systems Group From CMC, Business Systems Units

LOS ANGELES — Pertec Computer Corp. has combined its CMC Group and Business Systems Division to form the Data Systems Group.

The move was designed to enable Pertec to concentrate a more directed focus on its two primary areas of business and to consolidate resources, according to Ryal R. Poppa, chairman, president and chief executive officer.

Late last year, the company formed the Microsystems and Peripheral Group to coordinate management of the minicomputer and microcomputer peripheral equipment and systems products.

"With the formation of the Data Systems Group, we anticipate the same level of efficiency in our approaches to the distributed processing markets, the small business computer users and the OEMs," Poppa said.

"Also, we will be able to position ourselves to more fully take advantage of future growth potentials and additional acquisitions in new market areas," he added.

With the formation of the Data Systems Group, the company is restructuring its Business Systems Division, which will be headed by Donald F. Orr, division vice-president and general manager.

U.S. end-user sales and lease operations will be organized into the CMC Division, headed by Daniel R. Carter, division vice-president and general manager.

Supershorts

H. Earle Vaughan, a pioneer in the Bell System's research and development of electronic switching systems for the telecommunications network, has received the Medal of Honor from the Institute of Electrical and Electronics Engineers.

- - -

Computer Sciences Corp. has established a Defense Systems Division in Moorestown, N.J., for the design and engineering of automated military combat and tactical systems.

- - -

Mirco, Inc. and Control Data Corp. have signed a marketing agreement making Mirco's digital circuit/fault simulator, Flash, available on CDC's Cybernet time-sharing system.

- - -

Logica, a European service firm, has opened a New York office to market its banking and communications systems to U.S. clients.

- - -

Siemens AG has acquired MSP Ltd.'s Testmanager system for its use. Under the agreement, the firms are joint owners of the Siemens version and both are free to offer it to users of either the BS1000 or BS2000 operating systems for the 4004 and 7000 range of computers.

- - -

Threshold Technology, Inc. has appointed Marubeni Corp. of Tokyo as its Far East distributor.

- - -

Pertec Computer Corp. has appointed Machine Sussidiare Elettroniche of Turin as its Italian distributor for the XL line of distributed processing systems.

- - -

Mohawk Data Sciences Corp.'s System 2407-T20 low-speed Autodin terminal has received Category II approval from the Defense Communications Agency.

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Communications Sciences, Inc. and International Communications Systems Consultants Ltd., of Great Britain have signed an agreement to cooperate on a worldwide basis in the marketing and provision of consulting engineers services in the fields of telecommunications, data communications and data processing.

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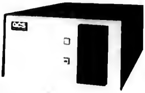

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CSC Gets $3.2 Million Job From FAA

WASHINGTON, D.C. — The Federal Aviation Administration (FAA) has awarded a $3.2 million contract to Computer Sciences Corp. (CSC) for a system to provide up-to-the minute air traffic flow information.

The system is expected to help reduce aircraft delays and thus conserve fuel, according to an FAA spokesman.

Based on an IBM 9020A in Jacksonville, Fla., the system will tell FAA officials how many aircraft are actually in the air at any one time. The FAA currently leases computer time for this chore from First Data Corp., and that system only provides the number of places scheduled to be aloft.

Under the contract, CSC will provide the programming for the 9020A, which will be tied directly to the control facility by high-speed circuits and replace the leased, time-shared system upon which the FAA now relies.

Programming for the basic system is expected to be completed in 18 months, the spokesman stated.

The Jacksonville-based system will be notified when each flight actually leaves an airport, so the control facility will not find itself planning to handle traffic that is not there, he noted.

The system will be advised of all congested airports and will search its stored memory of departures to determine those aircraft due for arrival which have not yet departed. These planes can then be instructed to remain on the ground, thus avoiding airborne holding patterns and increased fuel consumption, he said..

Contracts

Other Awards

The Defense Communications Division of International Telephone and Telegraph Corp. has received a $36 million contract from the Air Force Systems Command's Electronic Systems Division for development of a functional prototype of a record data communications system.

Sorbus, Inc. has signed a $12 million contract with Electronic Memories & Magnetics Corp. (EMM) for maintenance, repair and refurbishing of all EMM memory products.

Digital Equipment Corp. has been awarded a $6 million contract by the General Services Administration for data acquisition systems.

Brandon Applied Systems, Inc. has received software contracts from United Airlines, Inc., FMC Corp. of Philadelphia and the Kendall Co. of Boston totaling $3.1 million.

Raytheon Co. has been awarded a $2.5 million contract by the U.S. Navy for development of 28 digital color display systems.

Calma Co. has received contracts totaling $1.2 million from Union Gas Ltd., Chatham, Ontario, and Washington D.C. Gas Light Co. for Calma Graphic Interactive computer-aided mapping systems.

Pertec Computer Corp. has signed a two-year follow-on contract with Univac to supply key-to-disk shared processor data entry systems.

Precision Monolithics, Inc. has been awarded a contract by Stromberg Carlson to supply monolithic Comdac Companding Digital-to-Analog Converter chips for Stromberg Carlson's System Century family of digital telephone switching systems.

Conrac Corp. has received a $1 million contract from Ford Aerospace and Communication Corp. Western Development Laboratories Division for the purchase of 800 Conrac high-resolution monitors.

Electronic Memories & Magnetics Corp.'s Severe Environment Products' Division has been awarded a contract by Simmonds Precision Products, Inc. for its Secs-11 minicomputer card set.

Sorbus, Inc. has received two contracts. The first is from American Used Computer Corp. to maintain the company's portfolio of Dataproducts off-line print stations. The second is from Synergex Corp. to bring its DP maintenance services to drug stores and pharmacies.

Computer Network Corp. has been awarded a contract by the Department of Health, Education and Welfare (HEW), Office of Education (OE) to provide computing services, user support services and conversion support required to offload DP from the HEW Data Management Center.

North Atlantic Industries, Inc.'s Qantex computer peripherals division has received a contract from Western Electric to supply 100 Model 2710 portable data storage units.

Florida Software Services, Inc. has been awarded a contract by the First National Bank of Merritt Island.

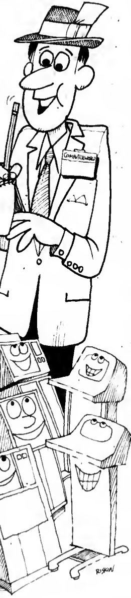
Mini-Computer Systems, Inc. has received a two-year contract from MCSI, Zurich, Switzerland, for the sale of Micos computer systems.

The Canada Systems Group has been awarded a contract by Supply and Services Canada to provide computer services and communications facilities to the Canadian Transport Commission, Ottawa.

Anacomp, Inc.'s subsidiary, EDP Corp. of Sarasota, Fla., has received a facility management contract to provide computer services to Manatee County on the West Coast.

Paradyne Corp. has received a $1 million contract from Burroughs Corp. for modems.

GTE Sylvania has received a U.S. Navy contract to supply test equipment for antisubmarine aircraft.



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June 6th — Preview Issue: A complete rundown of the companies, products and services, keynote speakers and technical sessions you'll see at NCC. (If you forget to bring your copy of *Computerworld*, don't worry. Free copies will be available at our booth.) This issue can help you pinpoint what's of interest to you before you attend, so you can make the most of your time there

June 13th — Show Issue: The Show Issue will include all the late breaking stories, program changes, intended product announcements and behind the scenes show details leading up to NCC. (It will also be available at our NCC booth.)

June 20th — Wrap-Up Issue: Cohesive analysis and summary of the significant events of the '77 NCC. This issue will give details on product announcements and will review the content of technical sessions, expert's observations and keynote speeches. If you have an interest in what goes on at NCC, don't miss it.

If you're a manufacturer or marketer in the computer field, don't miss these ad closing dates for *Computerworld's* NCC issues:

Preview Issue (June 6th) — Closed May 27.

Show Issue (June 13th) — Color and insert close: May 27; B&W close: June 3.

Wrap-Up Issue (June 20th) — Color and insert close. June 3; B&W close: June 10.

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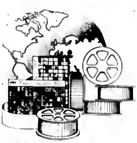

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SCOTSMAN, leading manufacturer of commercial ice systems, has an immediate opening due to promotion for a programmer. Join an expanding group and work with our EDP professionals developing new programs and revising existing ones. Must know COBOL, BAL, and DBOMP in our DOS environment. Two years experience in structured programming and manufacturing is desirable. Write:

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Personnel Manager
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Denver based bank DP subsidiary has openings for several intermediate level Programmer/Analysts. Requirements:

- Solid background in applications programming and systems analysis.
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All fees assumed by client companies: Contact Bill Denny, V.P. Call TOLL FREE 1-(800) 821-2270, X 605 (MO. 1-(800) 892-7655).

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RAMIS System Designer

Successful applicant must have a minimum of 2 years systems analysis experience with heavy emphasis on RAMIS design. Bachelor's degree preferred. Duties will include systems design in areas such as engineering, finance and marketing in a manufacturing environment.

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field engineering

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Amdahl Corporation
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Position available in Providence Office of international CPA/Consulting Firm.

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2 or more years' experience in Data Processing chained with IMS and/or IDS experience required.

Logical connection with Database Structure design, Database Assurance procedures and Data Dictionary experience desirable. A growing 4 billion character multi-vendor on-line database environment points to a challenging and rewarding future.

Job entry points in Database Design, Backup, Analysis and Data Directory segments of the organization are available.

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SENIOR PROGRAMMER for university administrative data processing systems. BA/BS degree required and experience preferred. Knowledge of ANS COBOL, IBM 370/OS, EXTENDED BASIC, and Timesharing Systems is required. This permanent position with excellent benefits including tuition waivers for graduate work will provide maximum potential for professionals growth. Equipment will include a 26 terminal network, graphics, access to an IBM 370-168, an IBM 360, Maxi, Mini and Micro computers. . Application deadline: June 25, 1977. Position available immedaitely. Apply to: Personnel Manager, Northwest Missouri State University, Maryville, MO. 64468. Affirmative Action - Equal Opportunity Employer.

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PROGRAMMER/ANALYST

Will work in development and maintenance of University administrative systems, performing as a leader and/or member in a project team concept. Requires ability to communicate with a variety of internal users. Experience in all phases of applications systems design through implementation. COBOL required. Experience in DEC-System 10, Assembly Language and Data Base Systems preferred. Previous experience in business or academic environment also preferred.

TUFTS university

Please send resume and salary requirements to Personnel Office, Sweet Hall, Boston Avenue, Medford, Mass. 02155.

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The Computer Science & Engineering Department at Martin Marietta Laboratories has a unique opportunity for applied research oriented individuals interested in distributed computing systems. The Laboratories, located south of Baltimore in the Maryland countryside, perform basic and applied research for Martin Marietta Corporation.

We are expanding our computer science research activities, seeking Ph.D.'s with a sound theoretical foundation and proven ability to define and pursue research in programming languages, operating systems, data base management and modelling as well as analysis and synthesis techniques for fault tolerant, distributed, real-time computer systems.

Send resume and salary requirements to:

C. Joyce McAleer
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As one of the midwest's leading multi-divisional management consulting and systems integration organizations, our steady growth requires top professionals in the following areas:

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Supervise programming efforts, including planning, scheduling, progress reporting. Previous management experience required.

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Design, develop, and maintain on-line and batch applications systems. Several positions available. Must ba competent in ALC and familiar with DOS. Experience with OS, TP monitors, VM and CMS is a plus.

METHODS AND PROCEDURES ANALYST

Establish DP work measurement standards and develop methods and procedures for improving work performance.

SYSTEM TEST SPECIALIST

Develop test procedures and define acceptance test requirements for systems under development. May coordinate system test activities.

TP MONITOR SPECIALIST

Evaluate on-line systems performance and recommend improvements. Provide technical support for applications programming groups, particularly systems under development. Heavy TP monitor experience required. Knowledge of DATACOMM/DC desirable.

Please send your resume to Louise Pettigrew.

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- PROGRAMMER

Send resume stating salary and Geographic preferance or call Scotti Devaney, in confidence.

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$1,912-$2,517/mo

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The starting salaries match the challenges plus a complete range of company benefits and outstanding promotional opportunities. Act now. Write or call: Victor Comptometer Corporation, Dept. 840, 3900 N. Rockwell, Chicago, IL 60618.

(312)539-8200

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Job No. CW 3181

WANG's R&D Telecommunications Software Development Group is looking for individuals to participate in the design, development and support of telecommunications and network software on WANG's computer and word processing products. Desirable qualifications include mini-computer, microprocessor or mainframe assembly language programming experience, systems programming, and familiarity with communications concepts and protocols. Degree required.

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Manager, Professional Recruiting

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CORY HINE

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BENTLEY PERSONNEL ASSOCIATES
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DIRECTOR OF ADMINISTRATIVE COMPUTING

University of Wisconsin-Stout

The University of Wisconsin-Stout in Menomonie, Wisconsin is accepting applications for the position of Director of Administrative Computing. Position Opening: August 1977. Salary Range: $20,000-$25,500. commensurate with training and experience. QUALIFICATIONS: Bachelor's Degree minimum, Master's Degree preferred. Prefer major educational program to be in Computer Science, Mathematics, Industrial Management or closely related fields. Successful management experience in data processing, preferably in an educational environment. Knowledgeable of latest trends in data processing, namely distributive processing using mini or micro processors. APPLICATIONS: A letter of application and resume should be submitted no later than June 24, 1977. Direct all materials to: Dr. Wesley S. Sommars, Search and Screen Committee, UW-Stout, Menomonie, Wisconsin 54751. *The University is an equal opportunity affirmative action, Title IX employer.*

SYSTEMS ANALYST

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1-8 years experience operating systems internals on medium or large scale systems

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Teletype Corporation, one of the largest manufacturers of telecommunications hardware, needs engineers with BSEE and computer science option. Some experience with EDP data terminals is desirable.

Involves the design of software for mini-computer and microprocessor based communications controllers. Should have background in data communications terminal design and PDP-11, Intel 8080 or equivalent software development experience.

These positions offer exceptional potential for growth, excellent starting salaries plus outstanding benefit program.

Send resume in confidence to J.E. Taylor, Dept. 1617-3.

TELETYPE CORPORATION
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TELETYPE

PROGRAMMER/ ANALYSTS

NCR Data Processing Division has immediate openings for Programmer Analysts in:

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- **Software Development**
- **Firmware**
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(Design/implementation of multi-program O/S in a high level language. Experience desired in data base or telecommunications, distributed processing, virtual machine, time sharing).

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents. Generous relocation allowance.

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To arrange for an interview during NCC in Dallas, June 13-16, please submit resume now including salary history and experience to the Professional Placement Office at the address below.

NCR

Data Processing Division
16575 W. Bernardo Drive
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INTERDATA
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As a professional in Microprogramming, you're aware of this area's bright future. Now, here's your opportunity to take advantage of this vast growth potential by putting your expertise to work with an industry leader.

Digital's Software Services' new Microprogramming group is currently seeking Senior level professionals to assume major responsibility for providing microprogramming software support for PDP 11 systems throughout North America and Europe. This rewarding international involvement will include consulting directly with principal customers on systems analysis, microprogram design, and microprogramming debugging.

You must have e a BSEE or equivalent, experience with electronic or logic design, and at least two years in microprogramming. Experience in the design and implementation of real-time software systems using assembly language (RSX-11 or MACRO-11 preferred) plus good customer-oriented interpersonal skills are also required.

Located at our corporate headquarters in Massachusetts, this is a group with exceptional expansion potential. If you meet the above requirements and are ready for challenges and success Digital offers, please forward your resume to Dale W. Welch, Digital Equipment Corporation, Dept. K522, 162 Main St., Maynard, Mass. 01754.

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Jobs in California, Connecticut, Georgia, Illinois, Indiana, Louisiana, Maryland, Missouri, Nebraska, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas and Wisconsin because we have large numbers of EDP jobs in these states, in addition to most of the remaining states. We even have some overseas.

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career update '77

MGIC Investment Corporation is proud of its prosperous growth and expansion. . .its earned reputation as a respected leader in the mortgage guarantee industry. This high level of achievement has opened up promising opportunities for data processing professionals who are interested in readdressing their career potential.

*SR. SYSTEMS ANALYST

Position requires a minimum of 2 years systems design and analysis experience coupled with desire to increase scope of responsibility. IBM, IMS, or DLI data base experience a plus.

*PROGRAMMER/ANALYSTS

Two years experience in programming plus l year of experience in analysis will involve you in challenging assignments to include our extensive customer service network.

SR. PROGRAMMERS

Three years COBOL experience under an OS operating system is essential. DLI or IMS experience preferred. Other operating areas will include our extensive CICS network.

*SOFTWARE PROGRAMMER

Experience with VSI, CICS, IMS, and ALC COBOL required.

*METHODS & PROCEDURES ANALYST

Two to three years of business systems procedural writing and analysis experience. Background in an insurance environment preferred. Good written and oral command essential.

These positions offer outstanding career visibility and growth to candidates with appropriate backgrounds. As a well established member of the financial community, we can offer challenging assignments and competitive compensation and benefits to qualified individuals. To initiate further communication, we invite you to forward resume with salary requirements to:

MR. LEE PATZA
Personnel Administrator
(800) 558-9900, (Toll Free)

MGIC Investment Corporation
MGIC Plaza. Milwaukee, WI 53201
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PROGRAMMERS

Our International Financial Systems group is looking for Programmers with 2-4 years experience to develop international banking systems.

These positions offer challenge, broadening of career, work in the forefront of technology and the opportunity to progress rapidly into a position of project management.

To qualify you will currently be working in a banking or communications environment. We prefer experience with COBOL, systems analysis and design. Some positions require a knowledge of ledger or minicomputer applications systems.

To investigate these outstanding opportunities, send your resume along with salary history to:

NCR

Mr. Vernon L. Mirre
Corporate Executive &
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NCR Corporation
Dayton, Ohio 45479

An Equal Opportunity Employment

DATA BASE ADMINISTRATOR AND PROGRAMMER/ANALYST

BURROUGHS 6700 - COBOL - RJE - DATA COMM - NC

Gifford-Hill & Co., Inc., a diversified company in the construction materials industry is accepting applications for the positions of Data Base Administrator and Programmer Analyst at its corporate office in sunny Dallas, Texas.

Requirements for both positions include a B.A. or B.S. in business, accounting, or computer science and a minimum of three years experience with Burroughs Large Systems.

The Data Base Administrator should have complete knowledge of Burroughs DMS II and prior experience in Data Base Administration.

The Programmer/Analyst should be proficient in COBOL and Structured Programming with thorough knowledge of common business applications.

Send your resume, including salary history, in complete confidence to:

Gifford-Hill & Company, Inc.
P.O. Box 47127
Dallas, Texas 75247

MANAGER manufacturing market planning

East coast computer manufacturer is actively seeking an individual to manage a group of professionals in a planning function, chartered to define computer hardware and application software requirements to meet the future needs of its customers in the manufacturing community, worldwide.

This individual should possess the following background:

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  - Material manager
- Manufacturing application software, e.g.
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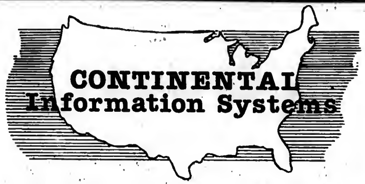

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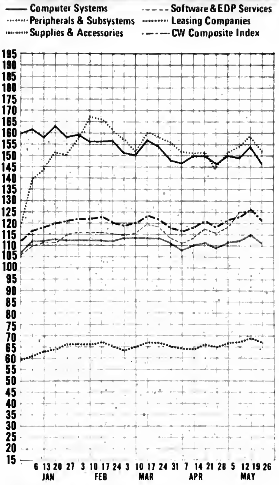

Earnings Reports

DATA SYSTEMS ANALYSTS

Three Months Ended March 31

	1977	1976
Shr Ernd	$.23	$.09
Revenue	1,142,675	655,406
Earnings	153,251	75,373

WUI

Three Months Ended March 31

	1977	1976
Shr Ernd	$.99	$.72
Revenue	26,900,000	22,856,000
Earnings	2,722,000	2,002,000

ALANTHUS

Six Months Ended Feb. 26

	1977	a1976
Shr Ernd	$.44	$.10
Revenue	17,332,002	13,567,955
Earnings	835,123	116,975

a-Restated.

AMDAHL

Three Months Ended April 1

	1977	1976
Shr Ernd	$1.30	$.34
Revenue	38,007,000	12,664,000
Tax Cred	4,795,000	666,000
Earnings	10,163,000	1,393,000

AMERICAN MICROSYSTEMS

Three Months Ended Dec. 31

	1976	1975
Shr Ernd	$.21	
Revenue	16,714,000	$14,694,000
Tax Cred	230,000	...
Earnings	490,000	(3,551,000)

BASF AG

Year Ended April 2

	1977 (000)	1976 (000)
Revenue	$8,840,000	$7,520,000
Earnings	256,000	158,000

BEEHIVE

Three Months Ended March 31

	1977	a1976
Shrd Ernd	$.30	$.22
Revenue	4,435,111	2,976,097
6 Mo Shr	.58	.37
Revenue	8,453,253	5,492,667
Earnings	546,464	350,207

a-Restated

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 25, 1977

All statistics compiled, computed and formatted by.
TRADE★QUOTES, INC.
Cambridge, Mass 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE MAY 29 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	0- 59	22 1/2	-1 5/4	-7.2
N	BURROUGHS CORP	99- 91	58	-2	-5.3
O	COMPUTER AUTOMATION	18- 29	29 1/4	+ 3/4	+3.0
N	CONTROL DATA CORP	20- 26	20 1/2	-1 1/4	-9.7
N	DATA GENERAL CORP	55- 46	59 1/4	-2	-4.8
O	DATAPOINT CORP	18- 30	21 3/4	- 7/8	-5.8
N	DIGITAL EQUIPMENT	57- 55	40 1/4	-5 5/8	-8.2
N	ELECTRONIC ASSOC.	2- 3	1 5/4	- 1/4	-12.5
A	ELECTRONIC ENGINEER.	8- 10	8	- 1/4	-3.0
O	FOUR-PHASE SYSTEMS	14- 17	13 5/8	-1 5/8	-9.1
N	FOXBORO	42- 54	50 3/8	- 7/8	-1.7
O	GENERAL AUTOMATION	6- 9	6	- 1/2	-7.6
O	GRI COMPUTER CORP	1- 1	5/4	+ 1/8	+20.0
N	HEWLETT-PACKARD CO	69- 87	74 1/8	-3	-3.8
N	HONEYWELL INC	44- 55	49 1/4	-2 5/4	-5.2
N	IBM	249-28A	247 1/8	-A 7/8	-2.7
O	MANAGEMENT ASSIST	5- 9	4 7/8	- 5/8	-11.5
O	MEMOREX	25- 29	22 3/4	-2 1/2	-9.9
O	MICRODATA CORP	7- 18	8 1/4	-1	-10.8
O	MODULAR COMPUTER SYS	5- 8	6 7/8	- 7/8	-11.2
N	NCR	52- 58	54 1/4	-1 1/8	-5.1
O	PRIME COMPUTER INC	12- 17	15 3/4	- 5/8	-4.3
N	PERKIN-ELMER	17- 21	17 7/8	- 1/8	-0.6
N	RAYTHEON CO	55- 69	63	- 7/8	-1.3
N	SPERRY RAND	54- 42	55 1/8	-1 7/8	-5.0
O	SYCOR INC	8- 15	8 5/8	- 5/8	-A.7
A	SYSTEMS ENG. LABS	9- 7	9 7/8	- 5/8	-A.0
N	VARIAN ASSOCIATES	15- 20	18 7/8	- 7/8	-A.4
A	WANG LABS.	14- 18	14 9/8	-1 5/8	-10.0

LEASING COMPANIES

EXCH		1977 RANGE (1)	CLOSE MAY 29 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COURIER CORP	8- 10	8 1/8	- 5/4	-8.4
O	COMDISCO INC	10- 13	10 1/4	- 1/4	-2.5
A	COMMERCE GROUP CORP	2- 2	2	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	0	0.0
N	DATRONIC RENTAL	1- 2	1	0	0.0
A	DCL INC	1- 2	1 5/8	- 1/8	-7.1
N	OPP INC	6- 8	6 5/8	+ 1/8	+1.9
N	ITEL	13- 16	15 5/8	+ 1/8	+0.8
N	LEASCO CORP	19- 24	20 5/8	-1 5/4	-7.8
O	LEASPAC CORP	1- 1	5/4	0	0.0
O	NRG INC	0- 0	1/8	0	0.0
A	PIONEER TEX CORP	7- 11	6 5/8	-2 1/4	-25.3
N	U.S. LEASING	10- 15	11 1/2	-1 1/4	-9.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1977 RANGE (1)	CLOSE MAY 25 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 1/4	0	0.0
O	ANACOMP INC	7- 9	9	+ 1/8	+1.4
A	APPLIED DATA RES.	5- 7	7	0	0.0
N	AUTOMATIC DATA PROC	23- 30	25 7/8	- 1/8	-0.4
O	COLEMAN AMERICAN COS	2- 2	1 5/8	- 1/8	-7.1
O	COMPU-SERV NETWORK	10- 15	12 1/4	- 1/2	-5.9
O	COMP ELECTION SYSTMS	A- 9	8 1/4	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 7	6 5/8	0	0.0
N	COMPUTER SCIENCES	7- 9	7 5/4	+ 7/8	+12.7
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	2- 5	1 7/8	- 1/E	-A.2
O	COMSHARE	5- 7	5 1/4	- 1/4	-4.5
O	DATA DIMENSIONS INC	4- 9	4 1/4	- 1/8	-2.8
O	DATATAB	1- 2	2 1/8	0	0.0
N	ELECTRONIC DATA SYS.	1A- 19	17	- 1/2	-2.8
O	IMSYTE CORP	2- 5	1 5/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/2	0	0.0
O	KEANE ASSOCIATES	5- 4	4	+ 3/4	+23.0
O	KEYDATA CORP	2- 3	2 1/4	0	0.0
A	LOGICON	7- 1A	15	-1	-7.1
A	MANAGEMENT DATA	1- 2	1 1/4	0	0.0
A	NATIONAL CSS INC	19- 25	20 5/4	+ 1/2	+2.4
O	NATIONAL DATA CORP	9- 7	4 5/8	- 1/4	-5.1
A	ON LINE SYSTEMS INC	17- 22	17	- 1/2	-2.8
N	PLANNING RESEARCH	5- 5	5 1/2	- 1/8	-3.4
O	PROGRAMMING & SYS	1- 1	9/8	0	0.0
O	RAPIDATA INC	2- 5	2	- 1/8	-9.8
O	REYNOLDS & REYNOLD	17- 20	17 1/2	0	0.0
O	SCIENTIFIC COMPUTERS	1- 3	3 1/2	+ 5/4	+27.2
O	TYMSHARE INC	14- 20	1A 3/4	+ 3/4	+4.6
A	UPS SYSTEMS	4- 9	4 5/4	+ 1/8	+2.7
N	WYLY CORP	1- 2	1 1/2	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE MAY 25 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 14	11 1/4	- 1/4	-2.1
O	ADVANCED MEMORY SYS	7- 9	8	- 1/4	-5.0
N	AMPEX CORP	R- 9	8 1/8	- 5/8	-7.1
O	ANDERSON JACOBSON	5- 4	3 1/2	0	0.0
N	APPLIED DIG DATA SYS	10- 16	11	+ 1/8	+1.1
O	BEEHIVE INT'L	9- 12	8 1/2	-1 1/8	-11.6
A	BOLT,BERANEK & NEW	7- 8	A 5/4	0	0.0
N	BUNKER-RAMO	8- 12	9 5/8	+ 1/8	+1.5
A	CALCOMP	3- 5	2 5/4	- 1/4	-8.5
O	CAMBRIDGE MEMORIES	1- 5	2 3/8	+ 1/8	+5.9
N	CENTRONICS DATA COMP	22- 28	24 7/8	- 7/8	-5.5
O	CODEX CORP	51- 47	46 1/4	- 1/4	-0.5
O	COGNITRONICS	1- 1	5/4	- 1/8	-14.2
O	COMPUTER COMMUN.	5- 6	5 3/4	.0	0.0
O	COMPUTER CONSOLES	4- 7	6	- 1/4	-4.0
A	COMPUTER EQUIPMENT	2- 3	5 1/8	+ 1/8	+4.1
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	0	0.0
O	COMTEN	10- 15	10 5/8	- 5/8	-9.6
N	CONRAC CORP	24- 28	26 5/8	- 5/8	-1.4

EXCH		1977 RANGE (1)	CLOSE MAY 29 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	4- 5	4 1/2	- 1/4	-5.2
O	DATA 100	6- 8	6 3/8	- 1/2	-7.2
A	DATA PRODUCTS CORP	9- 15	10	- 5/8	-5.A
O	DATA TECHNOLOGY	3- 4	3 3/4	0	0.0
O	DATUM INC	1- 2	1 1/2	0	0.0
O	DECISION DATA COMPUT	2- 2	1 1/2	- 1/4	-14.2
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	4- 9	4	0	0.0
O	FABRI-TEK	1- 2	7/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 3/8	0	0.0
N	HAZELTINE CORP	9- 12	9 5/8	- 5/8	-6.2
N	HARRIS CORP	28- 39	57 3/8	-1 9/8	-4.1
A	INCOTERM CORP	11- 19	11 5/8	-1 1/8	-9.0
O	INFOREX INC	4- 7	4 1/8	- 1/8	-2.9
O	INFORMATION INTL INC	11- 14	11 1/4	+ 3/8	+3.4
O	INTEL CORP	58- 57	43	-2 1/2	-9.4
A	LUNDY ELECTRONICS	5- A	4	0	0.0
O	MSI DATA CORP	6- 8	7 1/2	- 1/4	-5.2
M	MOHAWK DATA SCI	5- 8	4 7/8	- 1/4	-4.8
O	PENRIL CORP	2- 5	4 1/2	- 1/8	-2.7
A	PERTEC CORP	7- 9	6 1/2	- 1/2	-7.1
A	POTTER INSTRUMENT	2- 2	1 5/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	4 3/8	0	0.0
O	RECOGNITION EQUIP	7- 10	A 5/8	- 1/2	-7.0
O	SCAN DATA	1- 2	1 1/2	+ 1/8	+9.0
O	STORAGE TECHNOLOGY	10- 12	11 5/8	+ 1/4	+2.2
O	T BAR INC	7- 10	8 7/8	- 1/2	-5.3
O	TALLY CORP.	4- 6	4 3/4	+ 1/8	+2.7
O	TEC INC	7- 10	8	-1 5/8	-14.6
N	TEKTRONIX INC	29- 34	35 9/8	+ 1/4	+0.7
M	TELEX	2- 3	2 5/8	- 1/8	-5.0
O	WILTEK INC	1- 1	1/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE MAY 29 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 4	1 7/8	- 1/4	-11.7
A	BARRY WRIGHT	10- 14	11 7/8	-1	-7.7
O	CYBERMATICS INC	1- 1	1/2	0	0.0
O	DUPLEX PRODUCTS INC	14- 18	1A 1/4	+ 3/8	+2.5
N	ENNIS BUS. FORMS	6- 7	9 7/8	+ 1/8	+2.1
O	GRAHAM MAGNETICS	11- 14	15 1/4	- 1/4	-1.8
O	GRAPHIC CONTROLS	15- 18	17	+ 5/4	+4.6
N	3M COMPANY	48- 56	48 1/2	-5 3/4	-7.1
O	MOORE CORP LTD	50- 57	30	-1 1/4	-4.0
N	NASHUA CORP	16- 22	19 1/2	-2	-9.3
O	STANDARD REGISTER	18- 24	22 5/4	- 1/2	-2.1
O	TAB PRODUCTS CO	13- 17	15 5/4	0	0.0
N	UARCO	19- 22	20 1/4	- 1/4	-1.2
A	WABASH MAGNETICS	10- 15	15 1/8	- 7/8	-6.2
N	WALLACE BUS FORMS	17- 21	18	+ 3/8	+2.1

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